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PUBLIC HEALTH

REPORTS AND PAPERS

VOLUME V

PRESENTED AT THE MEETINGS OF THE

American Public Health Association

Chas. E. Munroe
Aug. 1880

IN THE YEAR

1879

A.P.H.A.

WITH AN ABSTRACT OF THE RECORD OF PROCEEDINGS

BOSTON
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INTRODUCTORY NOTE.

BY THE SECRETARY.

The contents of this volume include, 1. A brief historical sketch of the American Public Health Association, by Dr. Stephen Smith, of New York; and 2. The principal papers and reports presented, together with the discussions and proceedings which followed, at the seventh annual meeting held at Nashville, Tenn., November 18–21, 1879.

Upon a careful perusal of the volume it will be apparent that in considering the subject of city and town sanitation, of protection from a loathsome disease, of preventing the recurrence of a pestilence which for two successive seasons has seriously affected large portions of our country, the main efforts and study of the working members to advance the cause of Public Hygiene, have been put forth in directions plainly and urgently indicated by the sanitary wants and commercial interests of the entire country; while the Association, as a whole, may justly and proudly review the past year as the most eventful one of its existence.

Beginning its labors in 1872 with a few active and earnest workers in the cause of public sanitation, the Association has steadily progressed in the study and advancement of sanitary science, while its influence has been gradually extending to the most remote corners of the land. This is seen by the springing into existence of similar local organizations and the yearly increasing number of State and Municipal Boards of Health, — systems of health government which the Association has from the date of its first conference not ceased to advocate. State Boards of Health now number twenty-three, while more than one hundred and fifty cities and large towns have their local boards in active operation.

Conspicuous among the voluntary associations, are the Sanitary Council of the Mississippi Valley, the Michigan Sanitary Convention, and the New Orleans Auxiliary Sanitary Association, each affording instances of earnest work in the field of Public Hygiene, which commands the attention and respect of all who are acquainted with the transactions of these young and vigorous societies.

One important feature which has characterized the Association during the past year, is the existence of an Advisory Committee whose function is to confer with the Association through its Executive Committee on all questions pertaining to sanitary legislation. The first work performed by this Committee was in January, 1879, when at a meeting with the Executive Committee, held at Washington, D. C., methods of health government were discussed, and a plan was agreed upon to be recommended for the establishment of a National Board of Health, which thus far may be considered as the crowning work of the Association. The time has come when the advent of a pestilence to a Southern city can no longer be viewed with indifference at the North. In these days of rapid transit, when the distance from New Orleans to Maine or to Minnesota is accomplished within the incubative period of most contagious diseases, the sanitary, commercial, and social interests of the entire country are in a great degree dependent upon the sanitary welfare of each and every part; and it was believed by this joint committee that a central organization of competent persons possessed even of limited powers only, would greatly aid local authorities in the intelligent discharge of their duties. This belief has already been fully realized in the promptness and efficiency with which the National Board of Health assumes and discharges its functions, and the confidence it has inspired throughout the country.

Sad and bitter has been the experience of the last two years to a great portion of our country, and it is but fitting that so many active workers in Hygiene should turn their attention to the means of averting the recurrence of our recent calamity by carefully studying the nature, history, and causes of the disease which has smitten us; and although it may appear in these papers and discussions that there are still conflicting theories on the subject of contagion, of quarantine, and perhaps on other essential points, yet progress is onward, and it is confidently believed that from these deliberations will eventually be matured successful methods of preventing the recurrence of that disease which has recently swept over a large portion of our country, paralyzing its industries, and carrying want, bereavement, and desolation to thousands of its once happy homes.

CONTENTS.

THE SEVENTH ANNUAL MEETING.

Introductory Note iii

History of the Association. By Dr. Stephen Smith, of New York . . vii

Annual Address. By Prof. James L. Cabell, M. D., President of the Association 1

City Scavengering in Boston. By Eliot C. Clarke, C. E., Principal Assistant Engineer in charge of Improved Sewerage, Boston 24

Method introduced by the Auxiliary Sanitary Association for disposing of the Garbage of New Orleans. By Rev. Hugh Miller Thompson, of New Orleans 32

The Sewerage and Drainage of Cities. By Col. George E. Waring, Jr., C. E., of Newport, R. I. 35

Underground Sewers. By J. W. Compton, M. D., Evansville, Ind. . . . 41

Remarks upon Necessity for the Filing in a Public Office of Plans and Statements about certain Matters of House Construction. Upon the Study of the Origin of Contagious Diseases and the Liability to Error in this Direction. Upon the Necessity for Uniformity in the Publication of Vital Statistics. By Prof. Edward G. Janeway, M. D., Health Commissioner, New York City 44

On the Protection of the Innocent and Helpless Members of the Community from Venereal Diseases and their Consequences. By Albert L. Gihon, A. M., M. D., Medical Director, U. S. Navy 55

On Rotting Wood. By Prof. Wm. H. Brewer of Yale College, and President of the Board of Health of the City of New Haven 66

Action of Vegetable Acids on Tin. By Prof. Charles Munroe, of the Naval Academy, U. S. Navy 69

On Post Mortem Examinations and their Relations to Public Health. By Professor Edward G. Janeway, M. D., Health Commissioner, New York City 75

Cotton as a Fomite. By J. D. Plunket, M. D., President of the State Board of Health of Tennessee, Nashville, Tenn. 84

May not Yellow Fever Originate in the United States? By Alfred A. Woodhull, M. D., Surgeon U. S. Army 89

How to Deal with a First Case and Early Cases of Yellow Fever, when, in spite of Precautions, it has made its Appearance. By J. Chandler, M. D., of Memphis, Tenn. 108

Yellow Fever Epidemic in Memphis, 1879. By G. B. Thornton, M. D. . 111

Quarantine, and its Results in the State of Arkansas, 1879. By R. G. Jennings, M. D., of Little Rock, Ark. 121

The Inefficiency of Quarantine in the State of Arkansas during the Year 1879. By Jno. B. Cummings, M. D., of Forrest City, Ark. 127

The Yellow Fever Quarantine of the Future, as Organized upon the Portability of Atmospheric Germs and upon the Non-contagiousness of the Disease. By Henry Frazer Campbell, M. D., of Augusta, Ga. . 131

International Quarantine. By Bushrod W. James, M. D., of Philadelphia, Pa. 145

Etiology of Yellow Fever, with Remarks on Quarantine. By T. J. Tyner, M. D., of Memphis, Tenn. 147

CAMPS; DEPOPULATION OF MEMPHIS; EPIDEMICS, 1878 AND 1879. By COL. JOHN F. CAMERON, of Memphis, Tenn. 152
PROCEEDINGS AND DISCUSSIONS AT THE SEVENTH ANNUAL MEETING 164
DISCUSSION OF COL. WARING'S PAPER 165
ADDRESS OF GOV. A. S. MARKS 170
ADDRESS OF DR. E. M. WIGHT, President of the Tennessee State Medical Society 171
ADDRESS OF THE MAYOR OF NASHVILLE 172
DISCUSSION OF THE PAPERS OF E. C. CLARKE AND REV. HUGH MILLER THOMPSON 173

DISCUSSION OF DR. GIHON'S PAPER.

REMARKS OF DR. G. M. STERNBERG, U. S. Army 177
REMARKS OF DR. P. H. BAILHACHE, of the Marine Hospital Service 179
REMARKS OF DR. B. F. GIBBS, U. S. N. 180
REMARKS OF DR. J. M. KELLER 184

DISCUSSION FOLLOWING THE PAPERS OF DRS. WOODHULL AND TYNER.

REMARKS OF DR. EARLY 185
REMARKS OF DR. HARGIS 185
REMARKS OF DR. J. M. KELLER 191
REMARKS OF DR. W. G. AUSTIN 192
REMARKS OF DR. A. N. BELL 193
ANNUAL ELECTION OF OFFICERS 194

DISCUSSION FOLLOWING DR. CAMPBELL'S PAPER.

REMARKS OF DR. HOLLIDAY 196
RESOLUTION AND REMARKS BY DR. A. N. BELL 197
REMARKS BY DR. A. B. WATERFIELD 197
REMARKS AND NOTE. By DR. E. HARRIS 198
INTERNATIONAL RULES OF QUARANTINE. By SIR SHERSTON BAKER 202
REMARKS OF DR. HARGIS 211
REMARKS OF JUDGE CLAPP, of Memphis 213
REMARKS OF DR. BAILEY, of Louisville, Ky. 215
REMARKS ON INSPECTION OF STEAMBOATS AND OTHER VESSELS. By DR. A. N. BELL, of New York 221
RESOLUTIONS IN REGARD TO THE NATIONAL BOARD OF HEALTH 222
CASES OF YELLOW FEVER OCCURRING AT NEW ORLEANS IN 1879. By DR. S. S. HERRICK 223
ANNOUNCEMENT OF ADVISORY COMMITTEE 224
DISCUSSION OF PAPERS ON YELLOW FEVER. By DR. JEROME COCHRAN . . . 225

CONFLICTING THEORIES OF QUARANTINE.

REMARKS OF HON. S. C. COBB 227
REMARKS OF DR. A. N. BELL 227

ISOLATION IN YELLOW FEVER.

REMARKS OF DR. J. P. DAKE, of Nashville 128
REMARKS OF HON. E. A. JAMES, of Chattanooga, ON STATE RIGHTS AND A NATIONAL QUARANTINE 231
REMARKS AND RESOLUTIONS. By DR. O. R. EARLY 232

WORK OF THE NATIONAL BOARD OF HEALTH.

REMARKS OF HON. S. C. COBB 234
REMARKS OF DR. PINKNEY THOMPSON 235
DISCUSSION CONTINUED 236
NON-INTERCOURSE QUARANTINE 237
RESOLUTIONS TABLED 239
RESOLUTIONS OF THANKS 239
ADJOURNMENT 240
LIST OF MEMBERS ELECTED AT THE SEVENTH ANNUAL MEETING 241

APPENDIX.

LIST OF MEMBERS OF THE ASSOCIATION 244

HISTORICAL SKETCH OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.

BY STEPHEN SMITH, A. M., M. D.,
of New York.

THE AMERICAN PUBLIC HEALTH ASSOCIATION had its origin in that natural desire which thinkers and workers in the same fields, whether of business or philanthropy, or the administration of civil trusts, have for mutual council, advice, and coöperation. At the period of its organization, scientific preventive, or State, medicine, was beginning to supplant the worthless and expensive systems of public health administration which had long been in effect. State Boards of Health had been established in several States. New York City had secured the Metropolitan Sanitary Act, which gave her a most efficient and aggressive Board of Health; Chicago had organized its Health Department, under the provisions, in general, of the same law; New Orleans, St. Louis, and Washington City, had followed in the adoption of new and improved methods of health government. The work of these boards was far more radical than that of any previous health organizations in this country. Inquiries into the causes of diseases were undertaken by skilled inspectors, unsuspected sources of ill-health were discovered, and remedial measures were vigorously applied. The result was popular agitation of public health questions, adverse criticisms of the acts and powers of health authorities, and no small peril to the future growth of sanitary reform and progress in the United States. The men who were at that time bearing office in these boards maintained a close fellowship by correspondence, and mutually coöperated with each other in devising new plans of work, and in applying methods of reform. It required but slight discussion to prove the importance of closer and more practical relations among health officers to secure a general movement to organize a society of gentlemen devoted to the practical study and application of sanitary science.

Before proceeding to detail the several steps in the organization of the Association, it is important to notice that antecedent to this period an impulse had been given to the study of sanitary questions in this country, by a convention, which had but a short-lived, yet useful existence. This was the Quarantine and Sanitary Convention. It had its origin in an effort to reform the quarantine laws of the United States. The initial step was taken by DR. WILSON JEWELL, of Philadelphia, at that time, and for a considerable period anterior, a member of the Board of Health of that city.

The object he sought was the establishment of "a uniform code of regulations, operating alike in all seaports, and offering the least hindrance to an active commerce, and with a humane regard for the health of the passengers and crews, and the comfort of the sick on board of all vessels detained at quarantine stations."

The method of securing these reforms through the deliberations of a national convention was suggested by the Sanitary Conferences held in Paris in 1851 and 1852. It was believed that important practical results would flow from the deliberations of such a conference, if those delegated to it possessed "the required ability to investigate conflicting theories, adjust discrepant facts, and clear away the rubbish of error, superstition, and prejudice which overlaid the truth."

The Board of Health of Philadelphia took the initiatory step at the instance of Dr. Jewell, and on the 10th of November, 1856, passed a resolution directing three of its members, with the President, "to correspond with the Boards of Health of New York, Boston, Baltimore, and New Orleans, on the propriety of calling a convention of delegates from the various boards of health in the maritime cities of the United States, for the purpose of a conference in relation to the establishment of a uniform system of revised quarantine laws."

The proposition met with general favor, and the Board of Health of Philadelphia "assumed the responsibility of inviting delegates from Boards of Health, Boards of Trade, and from regular medical societies in each of the principal seaboard cities of the States, to assemble in convention in Philadelphia on the 13th of May, 1857." The Conference met on the day appointed, and nine States on the Atlantic coast were represented, by twenty-six different authorities, through seventy-three delegates. The session was continued during three days, and resulted in the adoption of a lengthy series of recommendations, relating to quarantine and its management.

The name of the organization was changed to "The Quarantine and Sanitary Convention," for the purpose of embracing, within the proper subjects of its consideration, both external and internal state and municipal hygiene.

The second meeting of the Convention was held in Baltimore, April 29th and 30th, and May 1st, 1858, at which twelve States were represented by eighty-six delegates. The most important acts of this meeting were the appointment of two committees, one on external hygiene or quarantine, and the other on the sanitary arrangements of cities.

The third meeting of the Convention was held in New York, April 27th, 28th, 29th, and 30th, 1859. It was composed of representative men of all professions and departments of business, and the discussions were of the very highest order. Among the active participants in the business of the Convention were DRS. JOHN W. FRANCIS, R. LA ROCHE, A. H. STEVENS, GEORGE B. WOOD, B. R. WELFORD, JOSEPH M. SMITH, D. B. REID, J. H. GRISCOM, J. WATSON. These men were among the veterans in sanitary studies and works, who have long since ceased from their labors. Reports of committees were made as follows: 1, on quarantine; 2, on the internal hygiene of cities. The latter report included special reports on, (1), sewerage, water supply, and offal; (2), on the importance and economy of sanitary measures to cities. The several subjects brought forward in these ably written reports were fully considered. Quarantine questions, especially, were thoroughly and exhaustively discussed by the exceptionally able men who attended that meeting, and a powerful impulse was given to the public interest in sanitary questions.

The fourth meeting of the Convention was held in Boston on the 14th, 15th, and 16th of June, 1860, and was numerously attended. The subjects discussed took a wider range than at any previous meeting, including vaccination, the sale of poisons, vital registration, civic cleanliness.

With this meeting the active life of the National Quarantine and Sanitary Convention closed. The civil war had already begun when the time arrived for holding the next annual meeting, which had been fixed to take place on Wednesday of the last week of May, 1861, at Cincinnati. The committee of arrangements, after due deliberation, decided not to call the meeting, owing to the disturbed state of the country, and it was accordingly indefinitely postponed. No meeting was subsequently called, and at the close of the war many of its most active supporters were dead, others had greatly changed their social and business relations, while many were preoccupied with pursuits foreign to sanitary studies and work. The Conventions, therefore, lapsed, and as an organization ceased to exist.

During the period of its existence the Convention issued four volumes of Proceedings, which fairly reflect the state of sanitary reform in this country, and the opinions of the more active workers and thinkers at that time prominent in the several States.

In reviewing these proceedings it is interesting to note several features in the development of the organization, and in its effect upon public opinion. 1. The suggestion of the importance of a Quarantine Convention was at first received with great doubt and distrust. Even men, actively engaged in the administration of quarantine duties, discouraged the agitation of questions connected with their service. They foresaw the danger of interference with existing quarantine systems should their defects become matters of public discussion. 2. At the first meeting of the Quarantine Convention the organization was enlarged, as to the scope of its work, so as to include both external and internal hygiene, the name being changed to the Quarantine and Sanitary Convention. 3. The success of the movement was of the most positive character from the first. The meetings were largely attended by the best sanitarians in the country, the reports were able and thoroughly prepared, and the discussions were exhaustive. Said the venerable DR. JACOB BIGELOW, of Boston, its last President: "The published labors of the annual meetings already passed are distinguished, in a high degree, by intelligence, impartiality, and untiring zeal on the part of those who participated in them. Seldom has any professional body, nay, any deliberative assembly in this country, charged even with the control of its greatest interests, brought into the field of discussion such an array of eloquent words, of lucid exposition, of well ordered and appropriate diction, and of inexhaustible learning, as that which last year marked the assault and defense of the doctrine of the contagiousness of yellow fever." 4. The influence of the Convention was marked during the four years of its existence. It stimulated to renewed zeal the few pioneers in sanitary reform; it gave new life to existing health organizations, and led to the formation of new boards of health, and, finally, it aroused the public mind, and pressed the claims of preventive medicine upon State and municipal authorities.

Though the civil war proved so disastrous to the Convention, as an organization, the seed planted was not destroyed. In New York the struggle for a better form of sanitary government was continued; and in 1866 the effort culminated in the passage of the Metropolitan Health Law by the legislature of that State. This law was modelled after the English Sanitary Act, and was adapted to the wants of American communities. It has been regarded by competent authority as the most perfect piece of sanitary legislation ever placed on the statute book.

The Metropolitan Board of Health was organized in March, 1866, and was immediately confronted with cholera, an epidemic of which had been slowly spreading westward through Europe for a twelvemonth. For the first time in the history of that scourge in this country, its progress was stayed by preventive measures. Public apprehension, which had reached the stage of panic, was allayed by the immediate success of the measures employed, and from that time cholera lost all of its terrors to the residents of that city. The success and popularity of the Metropolitan Board led, during the next six years, to the organization of many new boards of health in other States, and the Metropolitan Act was generally taken as the basis of legislation.

Soon after, State Boards of Health began to be organized: first in Massachusetts, in 1869; then in California, in 1870; next in Michigan and Louisiana, in 1871; finally in Minnesota and Virginia, in 1872. These organizations afford the most positive evidence of the growth and progress of a healthy public sentiment in the several States favorable to the incorporation of preventive medicine into civil government.

In 1872, and for the four years immediately preceding, the writer of this sketch was a member of the New York Board of Health, and actively engaged in its official duties. The correspondence which he was required to maintain with the medical officers of other boards of health elicited an interchange of opinions in regard to theoretical and practical subjects, which often resulted in harmonizing and unifying methods and measures of procedures in different cities and States, and in enlarging the scope of observation, investigation, and operation. The value of this comparison of views with other laborers in the same field became so apparent that it required but the suggestion that formal conferences of sanitary officers would result in developing new schemes of work, as well as in improving old and established methods, to secure the promise of attendance of several gentlemen from different parts of the country at a preliminary meeting to be held in New York.

The first meeting held under this call, which was preliminary to the large meeting of the same date, took place in the rooms of the New York Board of Health, 301 Mott Street, at three o'clock P. M., April 18, 1872. DR. E. M. SNOW, of Providence, R. I., was called to the chair. There were in attendance DR. J. H. RAUCH, of Chicago, Ill.; DR. J. ORDRONAUX, of Roslyn, N. Y.; DR. STEPHEN SMITH, of New York; DR. E. H. JANES, of New York; DR. C. C. COX, of Washington, D. C.; CARL PFEIFFER, architect, of New York. The meeting was entirely informal, and the discussion was limited to the question of the contemplated organization of a National Sanitary Association. The conclusion was that a larger and more formal meeting should be held in the evening, and that steps should then be taken to perfect an organization.

The meeting was accordingly held on the evening of April 18, 1872, at the New York Hotel. From the minutes it appears that the following gentlemen were present: DR. STEPHEN SMITH, of New York; DR. ELISHA HARRIS, of New York; DR. JOHN H. RAUCH, of Chicago; DR. CHRISTOPHER C. COX, of Washington; DR. MOREAU MORRIS, of New York; DR. HEBER SMITH, of the Marine Hospital Service; DR. E. H. JANES, of New York; CARL PFEIFFER, architect, of New York. In the absence of DR. SNOW, who had returned home on account of illness, DR. HARRIS was called to the chair, and DR. JANES was elected Secretary. The following extract from the minutes states the action taken by the meeting: —

> The chairman stated the objects of the meeting, and briefly reviewed the methods of studying and repressing the causes of epidemics and the preventable kinds of diseases by the help of hygiene and the application of physical knowledge generally to public health questions. Dr. Stephen Smith spoke of the necessity for a national organization limited in membership to the best of sanitary workers; to the increased interest generally felt in sanitary matters; and of the small amount of real knowledge obtained for want of combined action. Dr. Rauch said that he could testify to the growing interest manifested in sanitary matters in the West as shown by the frequent applications for information and for health reports, for which he had never known so great a desire as during the last few months, and he thought it now most important to effect an organization and elect permanent officers and members. Dr. Cox suggested that committees be at once appointed to perfect a plan of organization and to arrange place and time of meeting. Mr. Pfeiffer and Dr. Bacon each made suggestions in regard to the memberships in the proposed association. It was then unanimously voted that the persons present, together with those in attendance at the morning meeting, and others whose names are given, declare themselves a temporary committee for the purpose of creating a permanent Association for promoting public health interests. It was also voted that a committee on permanent organization be elected, and that this committee consist of ten members. The following gentlemen were then elected: Dr. Stephen Smith, Chairman, Drs. George H. Derby, Mass., Francis Bacon, Conn., Elisha Harris, N. Y., John H. Rauch, Ill., C. C. Cox, D. C., Wm. Clendenin, Ohio, Wm. Marsden, Can., C. B. White, La., F. Peyre Porcher, S. C. It was voted that the committee be enlarged, whereupon the following gentlemen were added: Drs. W. Parker, Mo., Thomas Stewardson, Pa., and Henry Gibbons, Cal. It was also voted that the Surgeon-general be requested to designate some member of the medical staff of the army to serve on this committee, and that the same courtesy be extended to the medical staff of the navy. The following named gentlemen were then added: Dr. J. M. Woodworth, Chief of U. S. Marine Hospital Service, Dr. M. Morris, N. Y., Dr. James Reeves, W. Va., Dr. Jerome Cochrane, Ala., and Dr. E. H. Janes, N. Y. The meeting adjourned to assemble at the call of the Committee on Permanent Organization.

That Committee on Permanent Organization issued a call for a meeting to be held at the Ocean Hotel, Long Branch, N. J., September 12, 1872. The meeting organized at 1.30 P. M., DR. ELISHA HARRIS, of New York, being chairman. There were present: DRS. C. C. COX, of Washington, D. C., JOHN M. WOODWORTH, Chief of Marine Hospital Service, HENRY HARTSHORNE, Pa., JOHN H. RAUCH, Ill., WILLIAM CLENDENIN, O., C. B. WHITE, La., C. F. CHANDLER, ELISHA HARRIS, STEPHEN SMITH, MOREAU MORRIS, C. P. RUSSELL, and E. H. JANES, of N. Y. Subsequently DR. FRANCIS BACON, of Conn., and MR. CARL PFEIFFER, of N. Y., were present. Drs. Hartshorne, Russell, and Chandler being present by invitation, were declared members of the Association. The chairman stated the object of the meeting to be the completion of the organization already commenced, and called for the plan proposed by the committee. The proposed plan of organization was then presented, which was revised and approved as the Constitution of the American Public Health Association. Dr. Cox presented the draft of a bill, which he proposed should be presented to Congress for the establishment of a sanitary bureau as a part of the Interior Department of the government.

It was voted, before adopting the Constitution as a whole, to nominate and elect members, and a large number of gentlemen were accordingly elected.

On motion, the consideration of the plan of organization was resumed, and it was further amended, after which the Association proceeded to the election of its officers, with the following result: —

President — STEPHEN SMITH, M. D., New York.
First Vice-president — EDWIN M. SNOW, M. D., Rhode Island.
Second Vice-president — C. B. WHITE, M. D., Louisiana.
Treasurer — JOHN H. RAUCH, M. D., Illinois.
Secretary — ELISHA HARRIS, M. D., New York.

EXECUTIVE COMMITTEE.

Elected Members.

FRANCIS BACON, M. D., Conn.
WM. CLENDENIN, M. D., Ohio.
CHRISTOPHER C. COX, M. D., D. C.
HENRY HARTSHORNE, M. D., Pa.
MOREAU MORRIS, M. D., N. Y.
JOHN M. WOODWORTH, M. D., D C.

It was then voted that the Executive Committee be authorized to publish the Constitution when adopted, together with a list of the actual members, and that a copy of the same be presented to each member elect with the notice of his election. It was also voted that the time and place of the first annual meeting be left to the decision of the Executive Committee. The Secretary was instructed to correspond with hygienists abroad for information concerning the prospective movements of cholera. The plan of organization was then voted complete, and adopted as the Constitution of the American Public Health Association.

CONSTITUTION OF THE ASSOCIATION.

TITLE. — 1. This Association shall be called "The American Public Health Association."

OBJECT. — 2. The objects of this Association shall be the advancement of sanitary science and the promotion of organizations and measures for the practical application of public hygiene.

MEMBERS. — 3. The members shall be selected with special reference to their acknowledged interest in, or devotion to, sanitary studies and allied sciences, and to the practical applications of the same. They shall be elected as follows: —

Each candidate for membership shall first be proposed to the Executive Committee in writing (which may be done at any time), with a statement of the business or profession, and special qualifications of the person so proposed; on recommendation of a majority of the Committee, and on receiving a vote of two thirds of the members present at a regular meeting, the candidate shall be declared duly elected a member of the Association. The annual fee of membership shall be five dollars.

OFFICERS. — 4. The officers shall be a President, a First and Second Vice-president, a Secretary, and a Treasurer.

The President shall be elected for a term of two years; the Secretary shall be elected for a term of three years; and all the other officers shall be elected annually.

PRESIDING OFFICER. — 5. The President, or, in his absence, one of the Vice-presidents, or, in their absence, a chairman *pro tempore*, shall preside at all meetings of the Association. He shall preserve order, and shall decide all questions of order, subject to appeal to the Association. He shall also appoint all committees authorized by the Association, unless otherwise specially ordered.

SECRETARY. — 6. The Secretary shall have charge of the correspondence and records of the Association; and he shall also perform the duties of Librarian. He, together with the presiding officer, shall certify all acts of the Association. He shall, under the direction of the Executive Committee, give due notice of the time and place of all meetings of the Association, and attend the same. He shall keep fair and accurate records of all the proceedings and orders of the Association; and shall give notice to the several officers, and to the executive and other committees, of all votes, orders, resolves, and proceedings of the Association, affecting them or appertaining to their respective duties.

TREASURER. — 7. The Treasurer shall collect and take charge of the funds and securities of the Association. Out of these funds, he shall pay such sums only as may be ordered by the Association, or by the Executive Committee. He shall keep a true account of his receipts and payments; and at each annual meeting, render the same to the Association, when a committee shall be appointed to audit his accounts. If from the annual report of the Treasurer there shall appear to be a balance against the treasury, no appropriation of money shall be made for any object but the necessary current expenses of the Association, until such balance shall be paid.

COMMITTEES. — 8. There shall be a standing committee, to be known as "the Executive Committee," which shall consist of the President, the First Vice-president, Secretary, and Treasurer, and six members annually elected by ballot.

All committees, and all members preparing scientific reports or papers to be laid before the Association, at its annual meetings, must give, in writing, the title and outline of such reports or papers to the Executive Committee, at least six weeks preceding the date of such meeting, to secure their announcement in the order of business.

EXECUTIVE COMMITTEE. — 9. It shall be the duty of the Executive Committee to consider and recommend plans for promoting the objects of the Association; to authorize the disbursement and expenditure of unappropriated moneys in the treasury for the payment of current expenses; to consider all applications for membership, and, at the regular meetings, report the names of such candidates as a majority shall approve; and, generally, to superintend the interests of the Association, and execute all such duties as may, from time to time, be committed to them by the Association. At least one month preceding the annual meeting of the Association, the Executive Committee shall cause to be issued to members a notice of such meeting, and they are authorized to publish the same in medical, scientific, and other periodicals, but without expense to the Association; such notice shall contain the order of business to be followed at said meeting, and briefly, the subjects to be presented, and the special points of discussion.

MEETINGS. — 10. The time and place of each annual meeting shall be fixed at the preceding annual meeting, but may be changed by the Executive Committee for reasons that shall be specified in the announcement of the meeting. Special meetings may be called, at any time or place, by concurrence of two thirds of the Executive Committee. There shall be no election of officers, or members, or change of By-laws, or appropriation of money to exceed the amount at that time in the treasury, at such special meeting, except by a vote of a majority of all the members of the Association. Whenever a special meeting is to be held, at least one month's notice shall, if possible, be given by circular to all the members, together with the order of business.

QUORUM. — 11. At the annual meeting, twenty-five members shall constitute a quorum for the election of officers, a change of the Constitution, the election of members, and the appropriation of moneys. Ten shall constitute a quorum at any session devoted to the reading of reports and papers, or discussions.

ORDER OF BUSINESS. — 12. The order of business at all meetings of the Association shall be fixed by the Executive Committee, and such order must be completed before any other business is introduced, except such order of business is suspended by a vote of four fifths present.

ALTERATION OF CONSTITUTION. — 13. No alteration in the Constitution of the Association shall be made except at an annual meeting, and unless such alteration shall have been proposed at a previous meeting, and entered on the minutes, with the name of the member proposing the same, and shall be adopted by a vote of two thirds of the members present.

The next day (September 20) was devoted to the discussion of questions proposed by members, and after a free interchange of opinions, the following subjects were referred to special committees for investigation, and report at subsequent meetings : —

COMMITTEES. — *On Coöperative Sanitary Legislation between the National and State Governments :* Chairman, DORMAN B. EATON, Esq., New York.

On the Comparative Mortality at Different Seasons of the Year in the Various Sections of the United States : Chairman, PROF. HENRY HARTSHORNE, M. D., Philadelphia, Pa.

On Healthy Dwellings for the Poor, and the Sanitary Reconstruction of Unhealthful Houses : Chairman, STEPHEN SMITH, M. D., New York.

On Local and Domestic Causes of Tubercular Phthisis, with Reference to Preventive Measures : Chairman, PROF. HOSMER A. JOHNSON, M. D., Chicago, Ill.

On the Codification and Digest of Laws relating to the Public Health in the several States : Chairman, PROF. JOHN ORDRONAUX, M. D., New York.

On the Propagation of Diseases of Animals to Man : Chairman, WILLIAM CLENDENIN, M. D., Cincinnati, Ohio.

On Sanitary Drainage of Towns and Cities : Chairman, J. H. RAUCH, M. D., Chicago, Ill.

On Water Supplies for Cities and Villages : Chairman, PROF. C. F. CHANDLER, New York.

On the Practical Lessons of the Recent Prevalence of Small-Pox, with Reference to its Prevention in the Future : Chairman, E. H. JANES, M. D., New York.

On the Progress and Prevention of Asiatic Cholera : Chairman, E. HARRIS, M. D., New York.

On Quarantine and the Official Method of Sanitary Control of Contagious and Infectious Diseases : Chairman, PROF. HENRY HARTSHORNE, M. D., Philadelphia, Pa.

On the Sanitary and Medical Management of the Mercantile Marine, and the Care of the Sick Seamen, with Reference to the Interests of the Public Health : Chairman, J. M. WOODWORTH, M. D., Washington, D. C.

On Hospitalism and the Relations of Hospitals to the Public Health : Chairman, STEPHEN SMITH, M. D., New York.

On Restrictions upon Prostitution and Syphilis : Chairman, W. S. BARKER, M. D., St. Louis, Mo.

On a National Sanitary Bureau : Chairman, CHRISTOPHER C. COX, M. D., Washington, D. C.

On a Uniform System of Registration of Diseases and the Causes of Death : Chairman, CHARLES P. RUSSELL, M. D., New York.

On Public Health Reports, and the Means of Promoting a Practical Knowledge and Ap-

plication of Sanitary Science among the People: Chairman, C. B. WHITE, M. D., New Orleans, La.

On Heated Terms, and the Methods of Determining the Movements of Heated Areas: Chairman, LORIN BLODGETT, Esq., Philadelphia, Pa.

On the Facts and Records of Meteorology and Climatology that may Promote Sanitary Knowledge: Chairman, G. W. HOUGH, M. D., Albany, N. Y.

On the Influence of the Production and Use of Native Wines upon the Vice of Intemperance, and upon the Public Health: Chairman, CHARLES N. ELLINWOOD, M. D., San Francisco, Cal.

On Areas of Sanitary Administration, and the Practical Adaptation of General Laws and Local Ordinances Relating to the Public Health: Chairman, E. HARRIS, M. D., of New York.

On the Practical Applications of Chemistry in Public Hygiene: Chairman, C. F. CHANDLER, Professor of Chemistry, New York.

On the Influence of Existing Social Systems on Health and Longevity: Chairman, FRANCIS BACON, M. D., New Haven, Conn.

On Sanitary Principles and their Requirements applied to Public Edifices and Private Residences: Chairman, CARL PFEIFFER, Architect, New York.

On the Sanitary Value and Uses of Shade Trees, Parks, and Forests: Chairman, FRED. LAW OLMSTED, Landscape Architect, New York.

On the Sanitary Preparation and Improvement of Sites of Cities and Villages: Chairman, PROF. JOHN S. NEWBERRY, M. D., Ohio.

After the consideration of various questions relating to the business of the Association, the following resolutions were adopted: —

Resolved, That the Executive Committee have power to make any needed or useful rearrangement of individual members in the committees, after communicating with the members concerned.

Resolved, That the Committee on Meteorology be instructed to avail themselves of the aid and suggestions of General Myer, Chief of the Signal Corps, U. S. Army, in regard to the scheme of meteorological observations, that may best be made available in studying the phenomena of epidemics.

Resolved, That the Executive Committee be directed to prepare a brief sketch of the history and purposes of this Association, together with an abstract of the minutes of its preliminary meetings, and publish the same with the Constitution.

Resolved, That when the Association adjourns, it will adjourn to meet in the City of Washington during the last week in February, at the call of the Executive Committee.

THE FIRST MEETING.

The Executive Committee found it expedient to change the time and place of meeting, and issued its circular for the first meeting, at Cincinnati, Ohio, May 1–3, 1873. The following extracts from the minutes exhibit the subjects discussed.

The Association convened May 1, 1873, in the hall of the Cincinnati College.

An introductory address was read by the President (Dr. Snow, V. P., in the chair), on "The Limitations and Modifying Conditions of Human Longevity as the Basis of Practical Application of Sanitary Knowledge."

The following papers, reports, etc., were presented for discussion: —

"Quarantine and the Importance of Uniformity of Quarantine Laws in different States and Countries," by William J. Wragg, Charleston, S. C.

A "Statistical Report of the Boards of Health of different Cities, their Modes of Administration, etc.," by Dr. J. M. Toner, Washington, D. C.

A "Report on a Uniform System of Registration of Diseases and the Causes of Death," by Dr. C. P. Russell, N. Y.

Dr. C. C. Cox read a report on "The Necessity of a National Sanitary Bureau."

Dr. N. Jarvis read a paper on "The Effects of Public Calamities in Diminishing the Number of Births."

A report on "The Recent Epizoötic," by Dr. A. B. Judson, of the Health Department, N. Y., was read by the Secretary.

Resolved, That in the judgment of this Association, the establishment of a National Sanitary Bureau, with relations to the general government similar to those of the Bureaus of Agriculture and Education, is highly desirable as a means of promoting sanitary science and the protection of the public health.

Resolved, That in our opinion it is of the utmost importance that a common nomenclature and classification be adopted for the purpose of the registration of deaths and diseases, and especially by all English-speaking peoples.

Resolved, That we regard the nomenclature and classification of diseases proposed by the College of Physicians of London, which has been extensively adopted in Great Britain and the United States, as more likely to be generally adopted for these purposes, than any other system yet proposed, and that we hereby recommend its provisional adoption in the United States.

Drs. J. J. Woodward, U. S. A., Edward Jarvis, Mass., and E. M. Snow, R. I., having been appointed a committee to communicate the foregoing resolutions to Dr. Sibson, of London, and to negotiate for the representation of the Association in the first decennial revision of the nomenclature, the following resolutions were presented: —

Resolved, That the American Public Health Association deems it opportune that an international medical congress be requested to assemble during the American Centennial of 1876, in Philadelphia, to consider and adopt a nomenclature and uniform classification of diseases in the registration of diseases and deaths throughout the world.

Resolved, That the Committee on Registration be requested to prepare and present to this Association a blank for uniform weekly and monthly reports of mortality in our cities.

Resolved, That Boards of Health be requested to make out their reports on vital statistics for the period beginning in January and ending in December, and not for any fiscal or municipal year.

SECOND DAY. — The Treasurer's report of the receipt of annual dues to the amount of $131, having been audited and approved, was adopted. The President having suggested the consideration of the publication of the Transactions, a special committee, consisting of Drs. Toner, Jarvis, and Bell, was appointed to consider the subject. An invitation to visit the House of Refuge having been read and accepted, it was voted that the Executive Committee arrange for the next meeting of the Association, and further appoint one or more commissioners to represent it at the International Statistical Congress.

The President read a report by Dr. Elisha Harris, of New York, on "Areas of Sanitary Administration and the Practical Application of General Laws and Local Ordinances relating to the Public Health." The following resolution was adopted: —

On motion *Resolved,* That a committee consisting of Dr. Elisha Harris, Dorman B. Eaton, Esq., LL. D., Dr. John Ordronaux, and Dr. Stephen Smith, be appointed to consider and report at the next meeting on the best plan for the appointment and organization of national, State, and local boards of health, and that the discussion of this report be made a special order of business, "and that this committee have power to fill vacancies."

Dr. Clendenin read a paper on "The General Causes of Disease."

A preliminary "Report on Quarantine and the Official Method of Sanitary Control of Contagious and Infectious Diseases," by Dr. Henry Hartshorne, Pa., was read.

The Secretary read a paper on "Quarantine," by Dr. Marsden, of Quebec, as an opening for a discussion which followed on Dr. Hartshorne's report.

The President announced the reception of a telegram from his honor the Mayor of Providence, R. I., inviting the Association to hold its next meeting in that city. The invitation was accepted, and subsequently it was resolved that the Association should meet at Providence, R. I., on the second Wednesday in September, 1873.

Dr. Rauch read a paper on "The Sanitary Drainage of Towns and Cities."

Dr. E. H. Janes read a paper entitled, "Practical Lessons drawn from the Recent Prevalence of Small-pox, with Reference to its Prevention in the Future."

THIRD DAY. — A communication was read from Dr. Charles A. Leas, Baltimore, asking that a committee be appointed to report on the best mode of utilizing sewage and other town refuse. It was voted that the subject of forming committees be referred to the Executive Committee, and that subjects for investigation and report be selected as nearly as possible in accordance with the wishes of the several members.

The following resolutions were then adopted : —

Resolved, That all reports and papers presented to this Association thereby become the property of the same.

Resolved, That all reports and papers be referred to the Executive Committee, with power to publish so much thereof, and in such form as, in the judgment of said committee, will be most promotive of the objects of the Association; but the publication of a paper shall not be regarded as committing the Association to the opinions expressed by the author.

It was also voted that it is the sense of this Association that its papers should be published in a separate pamphlet form under the title of " Transactions of the American Public Health Association."

Dr. Toner presented the following preamble and resolution, which were adopted : —

Whereas it is important that boards of health of cities should at all times have as definite information as to the number, condition, and distribution of their population as practicable; and whereas it has been found practicable in other countries to collect such information, approximating correctness, through the aid of circulars properly prepared and distributed, which mode is attended with but little if any cost, and can be performed by the ordinary force of the various boards of health; therefore, be it *Resolved*, That local boards of health be recommended, whenever practicable, to take a census of their population annually, on the 1st of January, by the instantaneous mode, that is, through the aid of circulars with blank inquiries upon all points of special interest to vital statistics and sanitary conditions, these blanks to be previously distributed to each family and housekeeper within the city, to be filled up by them at a fixed hour on the same day, the same to be called for on the following day by officers of the Board of Health, or by the police of the city, or by any other method that may be desirable.

An address on " The Homes of the American People; where and what they will be, as determined by Physical and Sanitary Influences," was then given by Professor Newberry, to whom the thanks of the Association were tendered for his able and elaborate treatment of the subject.

The thanks of the Association were also voted to the trustees and medical and surgical staff of the Cincinnati Hospital for their courteous attention; to Dr. Murphy, of Cincinnati, for his hearty reception and graceful entertainment of the members; to the daily press for its full and careful notices; to the Cincinnati Law School for the use of its hall; and to Dr. Clendenin, Health Officer of Cincinnati, for his uniform and polite attention to the comfort and convenience of the Association.

A vote of thanks having been tendered to the officers of the Association for the manner in which their duties had been discharged, and the minutes having been read and approved, the Association adjourned to meet at Providence, R. I., in the following September.

THE SECOND MEETING.

The second meeting was held in New York, November 11–14, 1873.

The Association convened in the hall of the Union League Club, November 11.

The President formally opened the conference by an " Address on General Sanitary Requirements, and the Purpose and Objects of the Association."

The following reports upon Physical, Educational, and Social Conditions relating to Hygiene were then read : —

A Paper upon " Perfection of Structure and Function in the Human Body," by Nathan Allen, M. D., Mass.

A Report upon "The Power of the Housekeeper over, and Responsibility for, the Health of the Family," by Edward Jarvis, M. D., Mass.

A Report upon "Physical and Moral Causes of Bad Health in American Women," by James E. Reeves, M. D., W. Va.

In the evening, Edwin M. Snow, M. D., V. P., presiding, a presentation of a summary of evidence and local reports upon cholera, as it has prevailed in the Mississippi Valley and elsewhere in America during 1873, was made, and the subject was discussed at length, and illustrated and explained by means of charts and maps, by members from various localities.

Addresses were made and papers read by the following gentlemen : —

C. B. White, M. D., President Louisiana Board of Health, on "Cholera as it prevailed in that State."

Ely McClellan, M. D., Surgeon U. S. Army, "On Cholera in Twenty-three Counties in Kentucky."

J. H. Rauch, M. D., "On that Disease as it prevailed at Chicago, Ill."

J. H. Van Deman, M. D., "On Cholera at Chattanooga, Tenn."

Statements were also made by Drs. John C. Peters and A. B. Judson, New York.

SECOND DAY. — The roll of members being called, it was found that the constitutional quorum of twenty-five were not present, and the same difficulty having occurred at all previous meetings since the organization of the Association, — on motion of Dr. Woodward, U. S. A., the Association was dissolved, and adjourned *sine die*. It was then —

Resolved, That the members present of the late Association proceed to form an organization to be called the "American Public Health Association."

Dr. Stephen Smith, of New York, was elected temporary chairman ; Dr. Elisha Harris acting as Secretary, *pro tem*. Dr. Woodward moved that a committee of five be appointed by the Chair to draft and report a form of Constitution for the consideration of the members.

The Chair appointed as such committee the following named gentlemen, namely : Dr. Janvier Woodward, Surgeon U. S. A., Dr. Elisha Harris, New York, Dr. C. B. White, New Orleans, La., Dr. James E. Reeves, Wheeling, W. Va., Dr. A. C. Hamlin, Bangor, Me., who retired for conference.

The special committee on Constitution submitted a draft of a Constitution for the action of the gentlemen present. It was —

Resolved, That the draft of the Constitution as presented by the special committee thereon, be read by sections and acted upon.

Amendments of original Constitution are shown in the clauses of the Articles here numbered, new words introduced being in *italics* : —

SECTION IV. . . . . *All the officers shall be elected by ballot, annually, except the Secretary, who shall be elected for a term of three years.*

VIII. . . . . All Committees, and all members preparing scientific reports or papers to be laid before the Association, at its annual meetings, must give, in writing, the title *of such reports or papers, the time to be occupied in reading them, and an abstract of their contents*, to the Executive Committee, at least six weeks preceding the date of such meeting, to secure their announcement in the order of business.

X. . . . . There shall be no election of officers, or change of By-laws, or appropriation of money to exceed the amount at that time in the treasury, at such special meeting, except by a vote of a majority of all the members of the Association. Whenever a special meeting is to be held, at least one month's notice shall, if possible, be given by circular to all the members, together with the order of business.

XI. . . . . At the annual meeting *nine* members shall constitute a quorum for the election of officers, a change of the Constitution, the election of members, and the appropriation of moneys.

Each and every section of the Constitution presented by the special committee having been severally read and adopted, on motion of Dr. Jarvis, of Massachusetts, the same was adopted as a *whole*, as the Constitution of the American Public Health Association. It was —

Resolved, That this Association assume all pecuniary liabilities of the late American Public Health Association, and that its Treasurer turn over such funds and papers as may be in his possession, belonging thereto, to the Treasurer (when elected) of the present Association.

The following gentlemen were then elected officers of the Association: —

Dr. Stephen Smith, N. Y., *President*.	Dr. J. H. Rauch, Ill., *Treasurer*.
Dr E. M. Snow, R. I., *First Vice-president*.	Dr. E. Harris, N. Y., *Secretary*.
Dr. C. B. White, La., *Second Vice-president*.	

Elected members of Executive Committee: —

Moreau Morris, M D., New York.	S. O. Vanderpoel, M. D., New York.
Edward Jarvis, M. D., Massachusetts.	J. W. Toner, M. D., District Columbia.
J. J. Woodward, M. D., United States Army.	A. N. Bell, M. D., New York.

The Executive Committee submitted a report, recommending that the members of the late Association, not present, be hereby declared elected members of the American Public Health Association; that the list of nominations for membership presented by the late Executive Committee of the late Association being approved by the present Executive Committee is respectfully submitted for election; and that the remaining portions of the programme, as furnished by the late Executive Committee, be adopted by the present committee: all which recommendations were unanimously adopted. A list of gentlemen was elected to be members of the American Public Health Association. (See *Official Catalogue and its dates.*)

It was then *Resolved*, That this Association strongly approves of the action of the Surgeon-general of the army in attempting to establish a great medical library, and that the work which, under his direction, has thus far been accomplished in this respect, is of such magnitude and character, as to deserve the thanks of the medical profession of this country; and further, —

Resolved, That in view of the importance of making the files of the said library complete in periodicals, State and municipal reports, and transactions connected with medicine and hygiene, the special attention of physicians charged with the preparation or distribution of such reports, et cetera, is invited to the importance of preserving, at least, one copy of every such document for the files in the said library.

Resolved, That a copy of these resolutions be forwarded to the Surgeon-general, with the request that he present the subject to the attention of Congress.

The Executive Committee then presented the following resolutions and recommendations, which were adopted: —

Resolved, That should cholera make its appearance in the coming season, the Executive Committee be authorized to investigate and collect all facts with reference to its propagation and prevention, in order that communities may be fully informed of the necessity of sanitary precautions.

Resolved, That the Executive Committee are hereby empowered to publish the papers read before this Association, or such portions of them as appear advisable, and to make a special assessment, not to exceed five dollars, from each member for that purpose, if found necessary.

Resolved, That the Secretary of the Association be directed to publish one thousand copies of the Constitution, and of the list of members, as soon after this meeting as possible.

It was decided that the next annual meeting should be held at Philadelphia on the second Tuesday of November, 1874.

Experience having shown the desirableness of such a course, it was then —

Resolved, That the Secretary be instructed to open correspondence with local health authorities of all parts of the United States, requesting information upon matters relating to the health of their respective localities, and offering to reply to any inquiries on similar subjects which may be made by them.

An abstract from a report "On Sanitary Relations and Health Principles of Architecture," by Carl Pfeiffer, Secretary of the American Institute of Architects, was then read by the Secretary. Gen. Francis A. Walker, Supt. U. S. Census, etc., and Professor of Political Economy, Yale College, New Haven, delivered an address, illustrated by charts, upon the "Relations of Race and Nationality to Mortality in the United States."

The following reports were also presented and read: Report upon "Alimentation considered in its Relations to the Progress and Prosperity of the Nation," by A. C. Hamlin, M. D., Me.

Paper upon "Atmospheric Electricity and Ozone, and their Relations to Health and Disease," by Geo. M. Beard, M. D.

Reports upon "Sanitary Care and Utilization of Refuse of Cities," by Dr. J. H. Rauch, Ill., and Dr. C. A. Leas, Md.

Prof. J. S. Newberry, of Columbia College, then delivered a discourse, illustrated by maps, upon the "Future Distribution and History of the Population of the United States as affected by Physical Geography."

A Report upon "Non-periodic Changes of Heat as an Element in Sanitary Climatology," illustrated by charts and diagrams, was presented and read by Lorin Blodgett, Esq., of Philadelphia, and after discussion was referred for publication.

The Secretary presented Reports from Boards of Health and Sanitary Authorities upon Malignant Cholera, as it has prevailed in the United States, during 1873, together with a translation of Prof. Max von Pettenkofer's official Report on "What to do against Cholera."

Dr. Austin Flint read a paper upon "Evidences of the Relations of Drinking Water to the Propagation or Localization of Typhoid Fever and other Diseases."

Prof. Charles F. Chandler then gave an illustrated discourse upon "The Sanitary Chemistry of Waters, and the Practical Methods of perfecting the Water-Supply of Towns and Cities."

THIRD DAY. — The following papers were read: —

Report upon "Yellow Fever as it prevailed at New Orleans during the Present Year," by S. C. Russell, M. D., La.

Reports upon "Yellow Fever at Mobile, Ala., and Pensacola, Fla.," by Drs. J. T. Gilmore and J. H. Hickman.

Report upon "Yellow Fever at Memphis, Tenn.," by Dr. J. H. Erskine, M. D., Tenn.

Report upon the "Natural History and Habits of Yellow Fever," illustrated by maps, by J. M. Toner, M. D., D. C.

An address was then delivered by the Hon. Dorman B. Eaton, upon the "Scope of Sanitary Laws," and the following papers were read and discussed: —

Paper upon "Sanitary Organization in Villages and Rural Districts," by Ezra M. Hunt, M. D., N. J.

"The Organization and Work of the Board of Health and Vital Statistics of Richmond County," by Jas. J. O'Dee, M. D., S. I.

"Local and Domestic Sanitary Cure of Contagious and Infectious Diseases, etc.," by Dr. Henry Hartshorne.

Papers in respect to Quarantine Establishments: by Dr. R. Lebby, Health Officer of South Carolina, Dr. G. W. Peete, Health Officer of Galveston, Texas, and Dr. A. W. Perry, New Orleans, La.

In the evening Hon. D. B. Eaton presided, and concluding addresses at Association Hall were given by Hon. Andrew D. White and Prof. F. A. P. Barnard.

FOURTH DAY. A communication inviting the Association to witness the operation of destroying the noxious gases generated in the process of rendering animal fats, was received from James Turner, Esq.; and a telegram was received from Hon. Lester L. Bond, Mayor of Chicago, cordially inviting the Association to meet in the City of Chicago.

Dr. Snively, of Pennsylvania, then read a report upon "Cholera as it prevailed at Pittsburg;" and Mr. Elwyn Waller, E. M., School of Mines, Columbia College, read a very valuable report on "Disinfection and Disinfectants."

The Principles and Practice of Quarantine and its Management in the Port of New York, were then discussed in addresses and statements by Drs. S. O. Vanderpoel, Health Officer of the Port of New York, A. N. Bell, Commissioner of Quarantine, and Elisha Harris, of the New York Health Department.

Dr. John C. Peters, of New York, then read an address on "Cholera as it prevailed at

Lancaster, Ky.;" and Dr. Quinn addressed the Association in respect to the subject of "Cholera at Cincinnati, Ohio."

The following resolution was then adopted: —

Resolved, That a committee, consisting of Dr. S. Oakley Vanderpoel, Health Officer of the Port of New York, and such other members (five in number) as the President may designate, report at the next session, the practice and principles which prevail at the quarantine establishment of New York, and such suggestions as the committee may give respecting quarantine regulations in maritime and river ports.

The following preamble and resolutions were then adopted: —

Whereas there is a probability of the prevalence of cholera, and other epidemic diseases in various portions of our country, the ensuing year, and as the legislative bodies as well as sanitary authorities in the different States of the Union will have to deal with important questions relative to health regulations;

Resolved, That the Executive Committee of the Association is hereby instructed to communicate with the Governors of the different States, with as little delay as practicable, presenting the reasons for, and urging the importance of, efficient sanitary organization based upon suitable laws and authority for State and local boards of health.

Resolved, That Hon. Dorman B. Eaton, with two other members appointed by the President of this Association, be a committee requested to prepare an outline of such laws and suggestions as may assist in attaining the foregoing objects.

The following resolutions were also adopted: —

Resolved, That a committee be appointed to prepare a form for a law providing for the organization of a National Health Department, or proper central organization, having relations to the government and to the people, relative to the interests of health and life, similar to those of the Department of Agriculture relative to the interests of agriculture, or of the Bureau of Education relative to the educational interests; that this committee be instructed to coöperate with a similar committee or "section" of the American Medical Association; that when a plan for a law shall be perfected, said committee be authorized to memorialize Congress for the enactment of such a law; and that the committee report whatever action it may have taken to this Association at its next meeting.

Resolved, That in the appointment of this committee, each State shall, so far as is practicable, be represented by a member of this Association; that the Hon. Dorman B. Eaton, of New York, be the chairman, and that Elisha Harris, M. D., Secretary of this Association, be the secretary of the Committee, the other members to be appointed by the President of the Association.

It was then *Voted*, that most hearty thanks are hereby tendered to the several distinguished citizens who have contributed to the objects of this sanitary conference by their carefully-prepared public discourses, and that the Secretary communicate this resolution to each of the following named gentlemen, and request copies of their respective discourses for publication in the Association's Transactions: F. A. P. Barnard, D. D., LL. D., President Columbia College; Hon. Andrew D. White, LL. D., President Cornell University; Gen. Francis A. Walker, Professor Political Economy, etc., Yale College; Prof. Charles F. Chandler, M. D., President Health Department; Prof. J. S. Newberry, LL. D., School of Mines, Columbia College; Prof. John Ordronaux, LL. D., State Commissioner in Lunacy, etc.; Hon. Dorman B. Eaton, Chairman, etc., Civil Service Reform; Hon. James W. Beekman, President Society New York Hospital.

The thanks of the Association were voted to the New York members of the Executive Committee for the measures taken to make the meeting profitable and pleasant; to the press for its faithful and ample reports of proceedings; and to Professor and Mrs. Chandler for their agreeable social entertainment.

The Association then adjourned, to meet in Philadelphia on the 10th day of November, 1874.

THE THIRD MEETING.

The third meeting was held in Philadelphia, November 10–13, 1874.

The Association convened in the Hall of the College of Physicians. The conference was formally opened by the President, Dr. Stephen Smith, of New

York, by an address on "The Purposes and Objects of the Association, and the Results already accomplished by it."

The following reports and papers were then read: —

A Paper on "Excessive Infant Mortality, and the Means of its Prevention," by Prof. Henry Hartshorne, M. D., Pa.

A Paper upon the "Influence of Hereditary Defects upon the Health of the People, with Suggestions in regard to Prevention and Eradication," by J. R. Black, M. D., Ohio.

"The Health of Tenement Populations and the Sanitary Requirements of their Dwellings," by Edward H. Janes, M. D., N. Y.

A Report upon "The Death-Rate of each Sex in Michigan, and Comparison with Dr. Farr's Life Tables of 'Healthy Districts' of England," by H. B. Baker, M. D., Mich. Dr. Baker was requested to furnish to the Association for its future use such diagrams and illustrations as he might be able to procure, bearing upon the subject of his paper.

Notes upon "Hospital Location and Construction," by J. S. Billings. M. D., Assistant Surgeon, U. S. A.

A Paper on "The Sanitary Relations of Hospitals," by William Pepper, M. D., Pa.

A Paper upon "Hospital Architecture and the Perfect Ventilation of Hospital Wards," by Carl Pfeiffer, Esq., N. Y.

By permission of the Association. Dr. J. L. LeConte, of Philadelphia, presented a voluntary contribution on the "Organization of Municipal Boards of Health."

A conference of sanitary officers here ensued upon Methods and Experience in the Public Health Service of cities.

In the evening, after some introductory remarks by Hon. Morton McMichael, who presided, an address upon the "Relations of Health and the Higher Culture" was delivered by Rev. Samuel Osgood, D. D., of New York; and a discourse by S. D. Gross, M. D., of Pa., "Upon the Factors of Disease and Death, after Injuries, Parturition, and Surgical Operations." The thanks of the Association were tendered to these two gentlemen for their able and eloquent discourses.

SECOND DAY. — The following reports and papers were read: —

A Paper upon "Building Ground in its Relations to Health and Disease," by Ezra M. Hunt, M. D., of N. J.

A Report upon the "Gathering, Packing, etc., and the Free Marketing of Vegetables and Fruits," etc., by S. C. Busey, M. D., of D. C.

The Conference then resolved itself into an Executive Session, and propositions for membership were presented and referred, in each case, to the Executive Committee for investigation and report. It was next —

Resolved, That on the first of each year the Executive Committee shall drop from the roll of members all persons who shall have failed to pay their dues for two consecutive years, and that it shall be the duty of the Treasurer to notify all persons in arrears of the existence of this rule.

The Executive Committee presented the following resolution, which was unanimously adopted: —

Resolved, That the volume of Transactions now in press, containing the Papers contributed during 1873, shall be issued, one copy each, to those members of the Association who shall have paid their dues for that year, and that, hereafter, the annual volumes of Transactions be issued to those members only who have paid their dues for the year to which the volume refers; but any member may obtain additional copies on the same terms as other subscribers.

The following papers were then presented: —

A Report upon "The Sanitary Government, Vital Statistics, and the Methods of Public Health Administration in the Cities and large Towns of North America," by E. Harris, M. D., N. Y.

A Paper upon "Conditions and Accidents which endanger, limit, or prevent Vaccination from giving full Protection against Small-pox," by J. M. Toner, M. D., D. C.

A Paper upon the question: "Does Small-pox become Epidemic, etc.?" by E. M. Snow, M. D., R. I.

A conference upon Hospital Construction and Administration was then inaugurated, which closed at 5 P. M., when the following papers were read: —

A Report upon "Yellow Fever in the Dry Tortugas," by Harvey E. Brown, M. D., U. S. A.

Notes upon "The Causation of Scarlatina," etc., by Dr. C. F. Rodenstein, of N. Y., and Report upon "Treatment of Gases from Rendering Tanks," etc., by Dr. B. C. Miller, of Ill.

In the evening, after a few remarks by the chairman, Prof. W. S. W. Ruschenberger, M. D., Pa., the following discourses were delivered: —

"Principles and Practice in Drainage and Sewerage in Connection with Water-Supplies," by Gen. E. L. Vielé, C. E.

"Certain Relations of Geology to the Water-Supplies of the Country," by Prof. Edward Orton, Ohio.

The thanks of the Association were voted to these two gentlemen for their excellent contributions.

THIRD DAY. — Dr. H. B. Baker, of Mich., presented to the Association from the State Board of Health of Michigan a folio volume made up of samples of poisonous wall papers, and the following resolution was adopted: —

Resolved, That the Executive Committee be instructed to consider the subject of poisonous compounds, and report what action, if any, may be necessary for this Association to take in respect thereto.

Communications were received from B. C. Miller, M. D., Ill., inviting the Association to hold its next annual meeting at the city of Chicago, and from Dr. Francis Bacon, Conn., containing similar invitation to New Haven, Conn.

The Association then proceeded to the consideration of Reports and Papers (Dr. E. M. Snow, R. I., in the chair), namely: —

Paper upon "Reciprocal Relations to the Public Health Service and the Highest Educational Qualifications of the Medical Profession," by the President, Dr. Stephen Smith, N. Y.

A Paper upon "Syphilis in its Relations to the Public Health," by Frederick R. Sturgis M. D., N. Y.

A Paper upon "Hay Fever, or Summer Catarrh," by George M. Beard, M. D., N. Y.

A Paper upon "The Introduction and Spread of Infectious Diseases," by John C. Peters, M. D., N. Y.

A Paper upon "Suicide in large Cities," etc., by A. McL. Hamilton, M. D., N. Y.

A Paper upon the "Influence of the High Altitudes, etc., of the Table Lands of the Rocky Mountains upon Health and Disease," by B. E. Fryer, M. D., U. S. A.

Abstract of Special Reports by Army Medical Officers on "The Effect of Mountain Climates on Health," by J. S. Billings, M. D., U. S. A.

"Certain Perils of the School-Room," etc., by A. N. Bell, M. D., N. Y.

Dr. D. F. Lincoln, of Boston, Mass., offered some remarks in respect to the Medical Branch of the Social Science Association of Boston, and read a list of subjects proposed to be discussed at an intended meeting to be held, possibly, at Detroit, Mich.

The Association here resolved itself into a conference upon Methods, Experience, and Improvements in the Public Health Service, and the following subjects were discussed: —

"Fœcal Poisoning in the Air," by Dr. B. A. Segur, Brooklyn, N. Y.

"Water Closets," by Dr. J. S. Steuart, Md.

Dr. Segur presented the following resolution: "That Water Closets should, under all conditions, take the place of sewer-connected vaults."

"Sewerage and Drainage," by Dr. C. C. Cox, D. C.

"Night Soil and Cleaning of Privy Vaults," by Dr. B. C. Miller, Ill.

"Water Closets," by Dr. J. H. Rauch, Ill.

"Water Closets," Dr. Jos. C. Hutchison, N. Y.

The following resolution was then adopted: —

Resolved, That a committee of three, of which General Vielé shall be chairman, be appointed to examine into and report upon the sanitary relations of pavements to cities, and the principles required to be fulfilled in a proper kind of pavement.

In the evening the Association assembled at Horticultural Hall.

After a few preliminary remarks by the chairman, Hon. Joseph R. Chandler, of Pa., a discourse, "Health Laws, and the Interests and Obligations of the State and National Governments pertaining to them," was delivered by Dorman B. Eaton, Esq., N. Y.

Hon. L. H. Steiner, M. D., of Md., read a paper upon "Health, a Prerequisite of National Success in Peace and in War," followed by Rev. Dr. Bedel and Dr. D. Hayes Agnew, who delivered brief discourses.

The thanks of the Association were tendered to Dorman B. Eaton, Esq., and Hon. Lewis H. Steiner, M. D., for their discourses.

FOURTH DAY. — It was *Resolved*, that a committee of four be and the same is hereby appointed for the purpose of investigating and reporting on the extent to which poisons are used, in an unsafe manner, for agricultural and other purposes, and to recommend suitable regulations and restrictions with regard to the same, which was adopted, and the President appointed, as such committee, S. Weir Mitchell, M. D., Pa., J. H. Rauch, M. D., Ill., J. L. LeConte, M. D , Pa., R. C. Kedzie, M. D., Mich.

Resolved, That a committee be, and hereby is, appointed to prepare schedules for the purpose of collecting information with regard to the present condition of public hygiene in the principal towns and cities of the United States, and the laws and regulations, State and municipal, relating to the same, and to report at the next annual meeting.

The committee consisted of J. S. Billings, M. D., U. S. A., *Chairman ;* Elisha Harris, M. D., New York ; J. M. Toner, M. D., Washington, D. C. ; A. N. Bell, M. D., of Brooklyn ; H. B. Baker, M. D., of Michigan ; Ezra M. Hunt, M. D., of New Jersey ; S. C. Busey, of Washington, D. C. ; B. C. Fryer, M. D., U. S. A. ; Frank Reilly, M. D., Marine Hospital Service ; John L. LeConte, M. D., of Philadelphia ; Edward Shippen, M. D., United States Navy ; C. B. White, M. D., of New Orleans ; Edwin M. Snow, M. D., of Rhode Island ; and Josiah Curtis, M. D., of District Columbia, and such other persons as the committee may, from time to time, deem expedient to associate with them.

Resolved, That the Secretary be directed by the Association annually to report, on the first day of the annual session, the results of correspondence and information relating to public health.

The Auditing Committee on the Treasurer's Annual Report reported it correct and correctly vouched. A paper was then read upon "Pharmacy in its Sanitary Relations," by J. M. Maisch, M. D., Secretary of the American Pharmaceutical Association.

The Association then proceeded to the election of officers for the ensuing year. Dr. Stephen Smith was reëlected President, but declining to serve, Dr. J. M. Toner, D. C., was nominated for the office, and the list then stood as follows for 1875 : —

Dr. J. M. TONER, D. C., *President.*
Dr. EDWIN M. SNOW, R. I., *First Vice-president.*
Prof. H. HARTSHORNE, M. D., Pa., *Second Vice-president.*
Dr. J. H. RAUCH, Ill., *Treasurer.*

Elected members of Executive Committee : —

DR. STEPHEN SMITH, New York.
DR. MOREAU MORRIS, New York.
DR. A. N. BELL, New York.
DR. J. J. WOODWARD, United States Army.
DR. J. S. BILLINGS, United States Army.
DR. J. S. STEUART, Maryland.

On motion of the Executive Committee, a special committee, consisting of Hon. L. H. Steiner, Md., Drs. J. M. Toner, D. C., E. M. Snow, R. I., and Josiah Curtis, D. C., was appointed to report on plans for establishing State Boards of Health.

The following resolutions were presented by Prof. Henry Hartshorne, M. D., of Pennsylvania, and adopted : —

Resolved, That, for a city, properly arranged and conducted abattoirs, subject to municipal regulation, are always preferable to a number of private slaughter-houses.

That the best practicable management of large abattoirs, with cattle and hog-yards, cannot be depended upon, at all times, to prevent their drainage from contaminating water and the atmosphere in their vicinity.

Therefore, such establishments should be located as far as practicable from the centres of population, and, if possible, upon tide-water.

Dr. Samuel D. Gross, of Philadelphia, submitted the following preamble and resolutions : —

Whereas, it is the solemn duty of every civilized government to provide means for the safety, happiness, and preservation of the health and lives of its subjects; and,

Whereas, a large number of the diseases incident to the human race are induced by causes inherent in our modes of living, and by our want of knowledge of the laws of hygiene, therefore be it —

Resolved, That a committee, consisting of a member of this Association from each State and Territory of the Union, of which the President of the Association shall be chairman, be appointed to petition Congress, at its next session, to institute a Bureau of Health, to be located at Washington City, with a branch at the seat of each State and territorial government.

Resolved, That we hereby invite the earnest coöperation of the auxiliary branches of this Association, and of all kindred bodies in the Union, in carrying out the objects of the foregoing resolution.

Dr. H. Earnest Goodman submitted the following resolutions : —

"That this Association urge upon the Governor and Legislature of each and every State in the Union the importance of enacting laws creating State Boards of Health, providing adequately for sanitary administration.

"That a copy of this resolution be forwarded to each Governor and Legislature, duly signed by the President and Secretary of the Public Health Association."

Voluntary contributions were presented by Drs. A. B. Judson, of New York, William Hunt, of Philadelphia, Heber Smith, United States Marine Hospital Service, and William S. Ludlum, of New York.

The minutes of the last annual meeting were adopted, and the reading thereof dispensed with, and the reading of the minutes of the present meeting was postponed until the next annual session.

It was then *Resolved*, That a committee be appointed to report at the meeting of the Association next year upon the sanitary and unhygienic condition of watering-places in this country.

The president appointed Prof. H. Hartshorne, chairman, to organize such committee.

Dr. Stephen Smith, of New York, was requested to prepare a paper upon the subject of hospitals, and submit the same to the Executive Committee for publication in the Transactions. The following resolution was then adopted : —

Resolved, That the Secretary be, and is hereby, authorized to obtain from Boards of Health and sanitary authorities, in their respective localities, information in regard to the progress of sanitary work and public health interests, and prepare the same for publication in the annual volume, under the supervision of the Executive Committee.

On motion of Dr. E. Harris, of New York, the Executive Committee was empowered to call a special meeting of the Association during the coming spring, and to designate time and place, if deemed suitable.

The thanks of the Association were voted to the trustees of the hall of the College of Physicians of Philadelphia for the use of the hall ; to committees and citizens of Philadelphia who so much appreciated and assisted to promote the objects of the organization, and to the daily press, especially the "New York Times," for their full and faithful reports of proceedings.

The Association then adjourned *sine die*.

THE FOURTH MEETING.

The fourth meeting was held at Baltimore, November 9–12, 1875.

First Day. — The meeting was called to order by the President.

Dr. James A. Steuart, Health Commissioner of Baltimore, and Chairman of the Committee of Arrangements, read an address of welcome to the Association, followed by an Introductory Address by Joseph M. Toner, M. D., President of the Association.

A paper on "Dwelling-houses in their Relations to Health," was read by Ezra M. Hunt, M. D., of New Jersey ; and a "Preliminary Report on the Sanitary Condition of American Watering Places," by Prof. Henry Hartshorne, M. D., University of Pennsylvania.

The afternoon's proceedings opened with the reading of the Report by the Secretary of the Association, on the information obtained concerning the Public Health, and the Progress of Sanitary Works in the cities of our country the past year. A discussion then followed: —

First. What public necessities require that there shall be a Central or State Board of Health in each State, and with what authority and duties should the State Board of Health be endowed?

Second. How shall local and State Boards of Health effectually supervise the Registration of Vital Statistics, especially as respects causes of death, and investigate the sources of preventable diseases, so as best to promote the public welfare?

Prof. E. Lloyd Howard, Secretary of the State Board of Health of Maryland, stated that their Board had just completed a survey of the condition of jails, almshouses, and other public buildings of the State, and for a better supply of water for Baltimore, of which a report was to be made to the next legislature.

After some discussion by Drs. Hunt and Hartshorne on the subject of "How best to extend Sanitary Information throughout the Country," papers were read by Prof. E. Lloyd Howard, M. D., Secretary of the State Board of Health of Maryland, on "Legislation upon Sanitary Matters," and by Franklin B. Hough, M. D., on "Public Health Interests concerned in the Preservation of certain Primeval Forests, and in the Cultivation of Groves and Trees."

In the evening, the Hon. Ferdinand C. Latrobe, Mayor of Baltimore, presiding, after an introductory address, and in the absence of D. C. Gilman, President of the Johns Hopkins University, whose illness prevented his presence, a discourse was read by Prof. Henry Coppeé, LL. D., of the Lehigh University, on "Health Subjectively Considered," followed by an address by Doıman B. Eaton, LL. D., Chairman of the United States Civil Service Commission, on "The Essential Conditions of Good Sanitary Administration." At the close of this address a letter was read from Archbishop Bayley, of Baltimore, to the Secretary of the Association, in reply to an invitation to be present and address the meeting, by Hon. Dr. Steiner.

SECOND DAY. — Dr. Toner, President, in the chair. The Secretary announced the names of the persons whom the Executive Committee had recommended for membership, who were unanimously elected.

The following resolution was submitted by the Executive Committee, and unanimously adopted: —

Resolved, That the election of officers and members of the Executive Committee be conducted in the same manner as at the Philadelphia meeting; namely, There will be no nominatious, but in lieu thereof each member will write on a slip of paper his preference for each office, and the results of this informal ballot will be taken in lieu of nominations, after which each officer will be separately voted for by ballot, and the Executive Committee will be voted for on a single ballot. If, on a ballot for the Executive Committee, any nominee shall receive a majority of the votes, he will be declared elected, and subsequent ballots will be for the remaining places only.

After the reading of the report of the committee on "A Plan for the Systematic Sanitary Survey of the United States: with introductory remarks on Medical Topography," by John S. Billings, M. D, of Washington, Chairman of the Committee, —

Dr. S. C. Busey, of Washington, offered the following resolutions, which were adopted, being seconded by Dr. E. Harris: —

Resolved, That the report of Dr. Billings be referred to the Executive Committee with instructions to appoint a special committee, whose duty it shall be to carry into effect the plan for a systematic sanitary survey of the United States.

Resolved, secondly, That the Executive Committee shall request the Surgeon-general of the United States Army to detail a medical officer of the army, who, under the direction of the Surgeon-general of the United States Army, shall coöperate with said special committee in the prosecution of the duties of the committee.

The following papers were then read: —

"A Report on the Drowned Lands of Orange County, N. Y., and Sussex County, N. J., and the Sanitary and Economic Importance of Drainage for them," by Prof. George H. Cook, State Geologist of New Jersey.

"Soil Drainage and Atmospheric Humidity, considered with Reference to their Influence upon Health and Disease," by Sandford B. Hunt, M. D., N. J.

"The Necessity for and Selection of Summer Resorts for the different classes of People," by W. C Van Bibber, M. D., Baltimore.

A Report on "The Use of Poisons in Agriculture and Horticulture, and Tests of their Effects on Food-Vegetables," by Prof. R. C. Kedzie, M. D., Agricultural College, Mich.

In the afternoon the following Papers were read: —

A Report on "Drainage, Sewerage, and Water-Supplies of Cities," by Gen. Egbert L. Vielé, C. E., N. Y.

"School Hygiene," by D. F. Lincoln, M. D., Boston, Mass.

"The Sanitary Relations of Drainage and Water-Supply in North Carolina and the South Atlantic States, as affected by Topographical and Geological Conditions," by Prof. W. C. Kerr, State Geologist of North Carolina.

"Nervous Disease among School Children, with Suggestions for its Prevention," by Allan McLane Hamilton, M. D., New York City.

"Sewer-Gas as a Cause of Diphtheria, Membranous Croup, and Typho-Malarial Diseases," by Prof. H. R. Noel, M. D., Baltimore.

"School-Room Stunting," by A. N. Bell, M. D., Brooklyn, N. Y.

The meeting then adjourned to 8 o'clock P. M.

At the evening session Hon. Joshua Vansant, Ex-Mayor of Baltimore, presiding, the following addresses were delivered: —

By Prof. Stephen Smith, M. D., on "The Application of Sanitary Principles to the Limitation of Perilous Massing of Populations in our Cities."

By Prof. F. Donaldson, M. D., on "The Influence of City Life and Occupations in developing Pulmonary Consumption."

THIRD DAY. — The Secretary read letters from absent members, and a communication from the Secretary of the Association of Health Officers of the Lower Rhine (Köln), requesting to be put in full fellowship with the American Public Health Association, for the mutual interchange of publications.

Dr. Harris presented from Mr. Ross Winans, of Baltimore, three monographs on the following subjects: "Baltimore Harbor Nuisance," "Ventilation of Dwellings," "Hygiene and Sanitary Matters." On motion of Dr. Harris,

Resolved, That a vote of thanks be tendered to Ross Winans, Esq., for the volumes presented, and that the same be placed in the library of the Association.

The following list of officers of the Association was elected, in accordance with the rules established by the Constitution and agreed upon at the present and the preceding annual meeting: —

President — EDWIN M. SNOW, M. D., Providence, R. I.

First Vice-president — JOHN H. RAUCH, M. D., Chicago, Ill.

Second Vice-president — FRANCIS A. WALKER, LL. D., New Haven, Conn.

Treasurer — J. FOSTER JENKINS, M. D., Yonkers, N. Y.

Secretary. — The term of the Secretary's office continuing three years, does not become vacant until the autumn of 1876.

Elected members of Executive Committee: —

DR. JOHN S. BILLINGS, U. S. A.
DR. EZRA M. HUNT, N. J.
DR. JOHN M. WOODWORTH, D. C.
HON. DR. L. H. STEINER, Md.
JACKSON S. SCHULTZ, New York.
HON. ALONZO W. BOARDMAN, Mass.

The Secretary read the following communication from the Centennial Medical Commission, Philadelphia: —

To the President American Public Health Association.

DEAR SIR, — On behalf of the Committee of Arrangements of this body, I am directed to ask that the American Public Health Association will appoint ten delegates to represent said Association at the session of the International Medical Congress, to be held in this city September 4 to 9, 1876.

Very truly your friend,
(Signed) WM. B. ATKINSON, Secretary, etc.

PHILADELPHIA, *November* 9, 1875.

The invitation was accepted, and the following gentlemen were appointed by the President as delegates : —

Dr. Joseph M. Toner, Washington.
Dr. C. F. Folsom, Boston.
Dr. J. S. Billings, Washington.
Dr. Stephen Smith, New York.
Dr. C. B. White, New Orleans.
Dr. J. G. Thomas, Savannah.
Prof. R. C. Kedzie, Lansing, Mich.
Dr. James A. Steuart, Baltimore.
Dr. Thomas M. Logan, Secretary State Board of Health, Sacramento, Cal.
Dr. Henry A. Johnson, Chicago.

The following resolution was adopted : —

Resolved, That the Treasurer is authorized to use the funds in his hands which pertain to the Philadelphia meeting (year 1874) to meet the engagements he has made with regard to the publication of Volume II. of the Papers and Transactions, and that all dues belonging to that year which may hereafter be collected shall be applied to the same purpose.

The following notice was announced : —

Proposed Amendments to the Constitution. — In Article III., line 4, after the words "shall be," read "active or honorary, and shall be." In the same article, after the last line, add "honorary members pay no fees." Proposed by J. J. Woodward.

In Article VIII., page 5, line 3, strike out the word "six" and insert "nine." Proposed by John H. Rauch.

Papers were then read as follows : —

Report on "Efficient House Connections with Sewers and the Protection of Houses against Sewer-Gases," by Frank Hambleton, C. E., of Baltimore, and a statement by Jackson S. Schultz, Esq., of New York, on the "Utilization of Animal and Vegetable Refuse Substances in our Large Cities."

Dr. Ezra M. Hunt opposed the feeding of hogs for food, as proposed in the latter paper. He considered the flesh unfit for consumption. There was no doubt that hogs would eat garbage and dead horses ; but who would eat the hogs? Hogs fed in that way were not like the hogs fed in the farmer's farmyard ; eating their flesh was like drinking the milk of swill-fed cows. He would turn Jew before he would eat that kind of pig.

Mr. Schultz replied that Dr. Hunt was eating that sort of swine-flesh, if he ate hog at all. A delegate inquired : Would not the locating of extensive hoggeries on the islands adjacent to New York produce evil effects from the exhalations ? Mr. Schultz thought they could be so managed as to be inoffensive. The following papers were then read : —

A paper on "Penny Wisdom and Pound Folly, or the Cost of a Great Epidemic of Small-pox to a Great City," by Benjamin Lee, M. D., Philadelphia, and a report on "Principles and Methods of Ventilation," by Carl Pfeiffer, F. I. A., New York.

The latter paper gave rise to some remarks to the effect that it was the duty of the owners of tenement-houses to provide a ventilating apparatus which could not be tampered with by the occupants, who were in many cases ignorant of the value and necessity of fresh air.

A paper on "The Relations of the Excessive or Habitual Use of Alcoholic Drinks to Public Health and Public Welfare," by Homer O. Hitchcock, M. D., President of State Board of Health, Kalamazoo, Michigan, closed the session.

In the afternoon, papers on "Alcohol in relation to Life Insurance," by W. G. Harrison, Jr., M. D., Baltimore, and "Sanitary and Economical Advantages of Small Hospitals or Village Infirmaries for Manufacturing and Mining Populations," by Thomas J. Dunott, M. D., Harrisburg, Pa., having been read, Dr. G. M. Sternberg, Assistant Surgeon, U. S. A., Fort Barancas, Florida, by request of the Executive Committee, read a volunteer paper on "Yellow Fever, its History and Origin, at Pensacola, Florida, in July, 1875," followed by a paper on "Yellow Fever on Pensacola Bay, Florida, in 1875," by Harvey E. Brown, Assistant Surgeon, U. S. A., Fort Barancas, Florida.

Facts relating to diseases among the Indian tribes of North America, by Josiah Curtis, M. D., Supervising Medical Officer to the Indian Bureau, Washington, D. C., were given in an extempore address, followed by a volunteer paper on "Western North Carolina as a Health Resort," by Dr. William Gleitsmann of Asheville, North Carolina.

Evening Session. — The audience was the most numerous of all the sessions, and comprised many ladies. Discourses were delivered by Hon. L. H. Steiner, M. D., on "A Sanitary View of the Question, 'Am I my Brother's Keeper?'" followed by Andrew D. White, LL. D., on "Sundry Disputed Points regarding Sanitary Care and Physical Culture in our Universities, Colleges, and Larger Schools."

FOURTH DAY. — The following resolution was then adopted: —

Resolved, That the Executive Committee of this Association is hereby instructed to memorialize, in the name of this Association, the Congress of the United States in favor of such legislation as will bring about a proper coöperation between the General Government of the United States and the several State Governments, for a uniform and efficient system of the registry of the deaths, births, and marriages of the population.

The President then announced the following members for the Committee on a National Sanitary Survey: Dr. Elisha Harris, New York, Chairman; Dr. E. M. Hunt, New Jersey; Dr. H. B. Baker, Michigan; Dr. John H. Rauch, Illinois; Dr. S. C. Busey, Washington, D. C.; Dr. James A. Steuart, Maryland; Dr. C. B. White, Louisiana; Dr. Thos. N. Logan, California; Dr. J. S. Billings, U. S. Army, Dr. H. E. Brown, Surgeon U. S. Army, Dr. Joseph H. Toner, Washington, D. C.; Dr. J. M. Woodworth, Washington, D. C.; with power to add to their number.

The following resolution, offered by the Secretary, was adopted: —

Resolved, That in view of the fact that the funds of the Association are insufficient to publish in full all the papers presented, the President shall appoint two members, who, with the Secretary, shall constitute a publishing committee.

Resolved, That it shall be the duty of this committee to examine the papers presented to it by the Secretary, and to decide as to which shall be published in full, and which in abstract or by title only.

Dr. J. Foster Jenkins, of Yonkers, N. Y., and Dr. B. A. Segur, of Brooklyn, N. Y., were appointed to act with the Secretary as such committee.

Dr. A. N. Bell then offered the following resolutions in memoriam, which were adopted: —

Whereas it has pleased Almighty God to remove from us by death Ernst Krackowitzer, M. D., and G. W. Peete, M. D.,

Resolved, That in the causes of their death respectively, the former by typhoid fever contracted in the exercise of his duty as a physician, and the latter in the gallant exercise of his office in the midst of a terrific storm, they have intensified their endearments to us as most useful members, and left lasting memorials of blessed examples in the purposes of this Association.

Resolved, That copies of this preamble and these resolutions be sent to the families of the deceased as an evidence of our heartfelt sympathy in their and our loss.

The Secretary then reported that there had been thirty-four papers read, leaving thirteen papers to be read. As there was not sufficient time, these were then read by title, as follows: —

"Infant Mortality in the State of Michigan," by H. B. Baker, M. D., Secretary State Board of Health and Registrar of Vital Statistics of Michigan. Report on the "*Anthrax Epizoötic, and the communication of its Infection to man, in the Genesee Valley, N. Y., in* 1875," and a paper on "*Hereditary Entailments in the Domestic Animals and in the Human Family*," by Prof. James Law, M. D., D. V. S., Cornell University, N. Y. Report on "Eradication of Hereditary Defects" (supplementary to report commenced in 1874), and a paper on the "Sanitary Value of the Dry-Earth Treatment of Excremental Matters," by J. R. Black, M. D., of Ohio. On "Water Filtration for Domestic Use," by Thad. M. Stevens, M. D., Indianapolis. On "The Special Causes which produce excessive Infant Mortality in Montreal, Canada," by J. J. Dugdale, M. D., Health Officer of Montreal. On "The Popularization of Sanitary Science in our Schools," by Prof. E. W. Claypole, Antioch College, O. On "The Organization and Service of Small-pox Hospitals, the Domestic Sanitary Seclusion and Transportation of Small-pox Patients," by Edward H. Janes, M. D., Assistant Sanitary Superintendent, New York. "Sanitary Principles in Home Architecture," by H. W. Dean, M. D., Rochester, N. Y. A report on "Laws, Sanitary Provisions, and Methods for securing the benefits of General Vaccination throughout the Country," by Elisha Harris, M. D., New York. "Moisture of Dwellings and Sick-Rooms considered In connection with that of Atmosphere," by Fred. Pettersen, M. D., Health

Officer, San Antonio, Texas. A paper on "Ozone and its Effects upon Diseases of the Respiratory Organs," by Fred. Pettersen, M. D.

The following resolutions were then unanimously adopted : —

Resolved, That the thanks of the Association are hereby tendered to the Committee of Arrangements for the completeness and liberality of their provision for the meetings of the session.

Resolved, That the thanks of the Association are tendered to the medical profession and the public for their interest in the objects of the Association, and to the Reporters of the Daily Press for the accuracy and fullness of their reports.

The meeting adjourned at noon, to meet in Boston in the autumn of 1876.

THE FIFTH MEETING.

The fifth annual meeting was held in Boston, October 3–6, 1876.

The Association convened in Huntington Hall, Boston, Mass. An address of welcome having been given by Prof. Wm. Ripley Nichols, the President, Dr. Edwin M. Snow, delivered the opening address.

A paper and propositions on "Sanitary Regulations Relating to Abattoirs," by Henry G. Crowell, Esq., of the Boston Board of Health, was followed by a general statement of the business of slaughtering in New York State, of Abattoirs and laws concerning them, by Dr. E. H. Janes, Assistant Sanitary Superintendent of New York, who subsequently offered the following resolution, which was adopted : —

"*Resolved*, That concentration of the slaughtering business in large abattoirs located at the water-side below cities, when possible, and remote from business centres and human dwellings, provided with facilities for utilizing all portions of the animal without delay, is regarded as essential for the protection of public health and as conducive to individual economy."

Second Day. — The proposed amendments to Articles III. and VIII. of the Constitution were considered and unanimously laid upon the table. The report of the Treasurer was submitted and referred to an Auditing Committee.

On motion of Dr. Toner, it was voted that the resolution submitted by Dr. Janes, in his paper, be reconsidered so far as the action thereon had been taken by the Association, but that the resolution, as originally offered, should be considered one of the conclusions of the author's paper.

Hon. Emory Washburn read the first paper, on "Expert Testimony," which was discussed by Prof. H. P. Bowditch, and others. The discussion was continued by Hon. Emory Washburn (on the resolution, offered on behalf of Prof. Wolcott Gibbs, as follows : "*Resolved*, That a committee of five be appointed to inquire what methods of obtaining expert testimony prevail in European countries, and to report at the next meeting of the Association the recommendation of an improved plan of procedure based upon the information thus received." Adopted unanimously.) — Laws here and in Europe differ ; no juries often in civil cases ; the accused has a right to meet not only his accusers, but also the witnesses in the case ; the theory of trial by jury under common law in this country is different from that which prevails generally in Europe ; the secrecy and wrongs of Star Chamber inquisitions really originated the practice of confronting the accused with his accusers ; no hearsay evidence is allowed, even on oath.

Dr. Bowditch said that Professor Gibbs specially wished a report to be made upon the forms adopted in presenting expert testimony before the courts in European countries, so that a substantial basis could be attained for improved practice in this country. Professor Gibbs's motion was seconded by Dr. Harris and adopted. Professor Horsford resumed the discussion : Experts considered here as belonging to the counsel, not to the court ; lawyers take little or more testimony as they please, to suit their cause ; experts and lawyers equally blamable ; experts yield to the lawyers, though not from want of rectitude ; in Austria, judge takes testimony of experts and gives his decision to the judge presiding ; experts not brought personally into court. Professor Horsford thought it important that "there should be some practicable plan in which legal counsel on both sides may readily concur." The discussion was continued by Professor Ordronaux, Commissioner in Lunacy of New York, and Senator Steiner, of Maryland. The motion of Professor Gibbs was then adopted. A paper by Dr. Steiner followed.

At the termination of this discussion, the order of addresses, etc., for Wednesday and Thursday evenings, was presented. A volunteer paper was read by Professor Horsford. A motion was adopted that the abstract by Professors Gibbs and Bowditch, and the papers of Professors Washburn, Horsford, and Ordronaux be furnished to the Executive Committee for publication.

Evening Session. — The President introduced Rev. Edward Everett Hale as Chairman for the evening, who briefly addressed the Association on "The General Health of Cities, in its Effects on the Inhabitants Morally and Physically."

Professor Austin Flint then delivered an address on "The Relation of Food to Personal and Public Hygiene;" a short extempore address followed, relating to the physical condition of the pupils at the School of Technology as affected by food and exercise, and especially by a hearty mid-day lunch.

THIRD DAY. — Profs. Wolcott Gibbs and Emory Washburn, of Boston, Dr. Stephen Smith, and Professors Ordronaux and Yeaman, of New York, were appointed by the President as a committee in pursuance of Professor Gibbs's resolution; and Drs. Billings, Rauch, and Steiner, were appointed as an auditing committee upon the Treasurer's accounts.

The reading and discussion of papers for the day were opened by Prof. E. S. Wood, M. D., on "Illuminating Gas in its Relation to Health," which was also discussed by Drs. Billings, Gihon, and Lincoln. A paper was then read on "Sanitary Requirements in Large Factories," by Dr. L. F. C. Garvin. After a discussion by Drs. Steiner, Toner, Garvin, and Harris, it was moved by the latter that the resolution of Dr. Garvin be adopted as the sense of the Association. A proposed amendment to substitute fifteen years for sixteen, as the age for children to attend half-day school was lost, and the original resolution was adopted as follows: —

"*Resolved*, That the due protection and welfare of factory operatives require, — 1. Half-day schooling for children under sixteen years of age; 2. Uniform hours of labor, not exceeding sixty per week; 3. Frequent inspection of the mills and tenement dwellings of factory villages, and of the milk sold to the inhabitants by an authorized public health officer."

An invitation to visit the Quarantine Institutions was accepted. The following papers were then read: "Water-Supplies for Large Institutions and Small Communities," by J. Herbert Shedd, C. E.; "Naval Architecture and the need of Sanitary Reform in Ship-life," by Dr. Albert L. Gihon; "The Sanitary Safety of Ships and those who Travel in them," by Dr. J. M. Woodworth; and "Practical Conclusions Concerning Marine Hygiene, Based upon the last Ten Years' Experience of the Ocean Lines of Ships in Communication with New York," by Dr. A. N. Bell.

Evening Session: 8 P. M. — Dr. Henry I. Bowditch gave an introductory address, and introduced Mr. Henley, late member of Parliament, inspector of one of the Local Government Board Districts in England, who gave a brief account of the organization of the local government boards of the central authority in England for the inspection of nuisances, drainage, sewerage, etc., and the promotion of improvements in the public health and poor law administration.

Mr. Charlton T. Lewis, Secretary of the Chamber of Life Insurance, New York, followed with a discourse on "Ancient and Modern Hygiene." Dr. John S. Billings made a concluding discourse, on "The Rights, Duties, and Privileges of the Community in relation to those of the Individual as regards Public Health."

FOURTH DAY. — The Executive Committee reported that papers from Dr. C. B. White, of New Orleans; Dr. John Morris, of Baltimore; Dr. F. D. Lente, of Florida; Dr. Walker, of Brooklyn, and Prof. Black, of Ohio, are submitted to the Association, with the recommendation that they be read and referred to the Executive Committee. Papers by Dr. John

Morris, of Baltimore, on "Scarlet Fever in Baltimore and Belair, Md.," and by Dr. C. B. White, on "Disinfection against Yellow Fever in New Orleans," were then read and referred to the Executive Committee for publication.

Drs. J. Foster Jenkins, L. H. Steiner, and J. M. Toner were appointed a committee to memorialize Congress concerning the completion of the bibliographical publication in the "Army Medical Bureau."

Prof. J. T Gardner, C. E., read a paper on "Topographical Surveys and Maps in their relations to Public Hygiene."

The following resolutions were adopted: —

"Whereas, This Association has projected and wishes to encourage a systematic and complete Sanitary Survey of the United States, and fully appreciates its importance, —

"*Resolved*, That it is the opinion of the American Public Health Association, that in every State, especially in the populous ones, a thoroughly accurate topographical survey is so essentially necessary as a basis of sanitary surveys and systematic drainage, and also of the most desirable researches and works for the prevention of disease; that the execution of such State survey is a public work which should be undertaken by the State government as a duty to the life and welfare of the people.

"*Resolved*, That the Committee on a Preliminary Sanitary Inquiry and Survey is requested to confer with the Superintendent of the Ninth National Census, the Commissioners and Director of the State Topographical Survey of New York, and with the Superintendents of Censuses in each State, and other expert and official authorities, with reference to the work which this Committee is projecting.

"*Resolved*, That the statement of the sanitary aspect of Topographical Surveys and Maps, as presented in Director James T. Gardner's address, accords with the best established facts in sanitary science, and that the prosecution of State Surveys, which will promote sanitary knowledge and human welfare in the manner set forth in this address, is a duty which should be encouraged by the people and the legislatures of the several States."

The Secretary, as Chairman of the Committee on the Organization of a Sanitary Survey of the United States, presented a report on that subject.

The following papers were then read: —

"The Gases of Decay and the Harm they Cause in Dwellings and Populous Places," by Professor Wm. H. Brewer; "The Sanitary Condition of Country Houses and Grounds," by Col. George E. Waring; and "The Sanitary Appointments and Outfitting of Dwelling-Houses, regarded as Essential and Obligatory," by Dr. Ezra M. Hunt. Dr. Lente's paper on "Florida as a Health Resort" was read by abstract.

An invitation to visit the Training School for Nurses was accepted.

The following resolutions were then adopted: —

Resolved, That the outbreak and fatal prevalence of diphtheria, scarlatina, and enteric fever in numerous places in the United States, render it important that there should be placed before this Association, at each annual meeting. a carefully collated body of authentic information concerning these maladies, and all endemic and epidemic diseases that admit of general or specific measures of prevention.

"*Resolved*, That the Secretary of this Association is hereby requested to lay this subject before the Executive Committee at its first meeting, and to use such means as in his judgment seem best adapted to obtain such information at the annual meeting."

"Whereas, epidemic yellow fever has very fatally invaded the coast of Georgia, and already decimated the populations of Savannah and Brunswick, while in several other places its appearance has awakened popular fear and called forth the best exertions of physicians and officers of health, —

"*Resolved*, That in the heroic and dutiful encounter of physicians and other attendants with the deadly epidemic in the places where it is prevailing, the best resources of sanitary science are demanded, and the highest attributes of the medical profession and officers of health are called into action, and that with those dutiful men in the midst of the epidemic, this Association has sincere sympathy, while in common with them, we all need to be incited to the application of sanitary knowledge for the mitigation and prevention of such pestilent visitations."

The following resolutions were then adopted: —

"*Resolved*, That we offer our cordial acknowledgments to the president and officers of the School of Technology, not only for the gratuitous use of their halls and lecture-rooms, during the sessions of the Association, but also for their personal attentions in promoting its convenience and comfort.

"*Resolved*, That the representatives of the daily press are heartily thanked for their accurate and full reports of the public sessions of this Annual Meeting.

"*Resolved*, That this Association, before its adjournment in the chief city of the State which has first and most largely illustrated the public service of a Central Board of Health in a Commonwealth, wishes to express, as the unanimous conviction of its members, that the example and works of the State Board of Health of Massachusetts are tending greatly to promote the progress, sanitary knowledge, organization, and popular support of Public Health Service in the States."

The Association adjourned to meet in Chicago the third Tuesday of September, 1877.[1]

OFFICERS FOR THE YEAR 1876–7.[2]

President, Dr. John H. Rauch, Chicago, Ill.
First Vice-president, Dr. Lewis H. Steiner, M. D., Frederick City, Md.
Second Vice-president, Dr. Ezra M. Hunt, Metuchen, N. J.
Secretary, Dr. Elisha Harris, New York.
Treasurer, Dr. J. Foster Jenkins, Yonkers, N. Y.

ELECTED MEMBERS OF THE EXECUTIVE COMMITTEE.

Prof. Hosmer A. Johnson, M. D., Chicago, Ill.
Dr. Charles F. Folsom, Secretary State Board of Health, Boston, Mass.
Dr. Albert L. Gihon, Medical Inspector, U. S. Navy, Annapolis, Md.
Dr. John S. Billings, Surgeon U. S. Army, Washington, D. C.
Jackson S. Schultz, Esq., New York.
Dr. John M. Woodworth, Supervising Surgeon-general U. S. Marine Hospitals.

THE SIXTH MEETING.

The Association convened at Chicago, September 25–27, 1877.

First Day. — The Association met at three o'clock P. M., in the parlors of the Grand Pacific Hotel. Dr. J. H. Rauch, President, in the chair. An Address of Welcome was delivered by Mr. Wirt Dexter, of Chicago. The annual address of the President was delivered by Dr. Rauch, the subject being "The Sanitary Problems of Chicago."

Mr. E. S. Chesbrough read a paper on "The Sanitary Drainage and Sewerage of Chicago."

Dr. Folsom presented a draft of a proposed law relating to pollution of streams.

Dr. Harris offered the following resolution, which was adopted: —

Resolved, That a committee of five members of this Association be appointed by the President to confer with the author of this paper on "Pollution of Streams," and to report, on the last day of this meeting, the suggestions and action which in their opinion should be recommended by this Association.

The President appointed as such committee, Mr. Chesbrough, Professor Churchill, Dr. Harris, Dr. Kearney, Dr. Reeve.

At the evening session Prof. N. S. Davis presided. After a brief address by the presiding officer, a discourse was delivered by Dr. Hosmer A. Johnson, the subject being "The Sanitary Geography of Phthisis Pulmonalis and other Pulmonary Diseases in Chicago and other Cities of the Northwest."

Dr. T. J. Turner, Medical Inspector, U. S. N., presented a paper on "Air and Moisture on Shipboard."

Dr. A. L. Gihon, also of the Navy, followed, with further statements confirmatory of the leading conclusions of Dr. Johnson's paper.

Dr. J. M. Gregory, Regent of the Illinois Industrial University, then read an essay on "The Relation of Hygiene to the Higher Education."

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[1] By order of Executive Committee this appointment was changed to September 25, 1877.

[2] Ex-officio Members of Executive Committee.

Second Day. — Dr. George L. Andrew, of La Porte, Ind., read a paper on "The Sanitary Value of Forests."

The Secretary presented a contribution from Prof. Wm. H. Brewer, of the Agricultural School of Yale College, containing a series of questions based on Dr. Andrew's paper, which was referred to the Executive Committee.

A paper by Dr. Ezra M. Hunt, of New Jersey, on "Sanitation of Individuals and Families as a Mode of arresting and preventing Pestilential Epidemics," was read by the Secretary.

A report on "The Teachings of Twenty-two Years' Observations and Records of Mortality from Croup, Diphtheria, and Scarlatina," by Dr. Edwin M. Snow, Superintendent of Public Health, Providence, R. I., was read in abstract, and on motion, this paper, and the charts, etc., pertaining to it, were referred to the Publishing Committee.

On motion, the paper of Dr. Ezra M. Hunt was referred in the same manner as that of Dr. Snow.

The Secretary submitted, by permission of the Chair, the outlines of a report and paper on the experience of New Orleans in guarding that port and city from yellow fever, by Dr. Samuel Choppin, President of the Board of Health of Louisiana, and of the Board of Health of New Orleans. On motion this report was accepted and referred to the Publishing Committee.

Dr. Henry M. Lyman, of Chicago, read a paper on "Stamping out Scarlatina and the Extinguishing of Zymotic Diseases," illustrated by charts.

At the afternoon session Dr. Azel Ames, Jr., read a paper on "The Removal and Utilization of Domestic Excreta."

Dr. N. S. Davis read a paper on "The Means of Diminishing Infant Mortality from Bowel Affections," which was discussed at some length by Drs. Hamill, Lyman, Cohen, Harris, and Turner.

In the absence of Professor Hitchcock, of Amherst College, Mr. Woodbridge read the paper furnished by Professor Hitchcock, on "Hygiene at Amherst College," which was followed by an essay on "Female Physical Culture at Ann Arbor College, Michigan," by Dr. L. H. Cohen, of Quincy, Ill.

At the evening session Dr. E. Ingalls presided.

Dr. Edmund Andrews read a paper on "The Sanitary and Economical Importance of the best Surgical and Medical Treatment of the Needy Poor."

The following preamble and resolution were adopted: —

Whereas, Public attention is being urgently invited to the duty of adopting measures for repressing and preventing pauperism; and

Whereas, There are causes of bodily disability which induce dependence and entail pauperism, which result from the neglect or incompetence of the attendance and medical and sanitary care received by the needy poor when such care should be given;

Resolved, That, in the judgment of this Association, it is eminently desirable that there be official inspection and inquiry for ascertaining and repressing the causes of bodily disability and pauperism; that this is an important public service in the interests of hygiene and the public welfare; and that those interests require that this duty should be conducted with faithfulness, and the results be published widely for the benefit of the people.

Dr. Lyman read a paper on "The Present State of the Exact Knowledge of the Causation and Prevention of Epidemic Diseases."

Rev. Brooke Herford read a paper on "Public Holidays and Public Health."

Third Day. — Dr. De Wolf, Health Commissioner, read a paper on "The Destruction of Offensive Gases from Rendering Tanks and Fertilizing Establishments." The subject was discussed at length by Dr. Folsom, of Boston, Dr. Chancellor, of Baltimore, Dr. Gihon, of the Navy, Dr. Kearney, of Cincinnati, and Dr. Johnson, of Chicago.

The following officers were then elected for the ensuing year: —

President, Dr. Elisha Harris, of New York.
First Vice-president, Dr. J. L. Cabell, of Virginia.
Second Vice-president, Dr. Hosmer A. Johnson, of Illinois.
Secretary, Dr. E. H. Janes, of New York.
Treasurer, Dr. Charles F. Folsom, of Massachusetts.

EXECUTIVE COMMITTEE.

Dr. John H. Rauch, President State Board of Health of Illinois.
Dr. C. B. White, ex-President State Board of Health, Louisiana.
Dr. C. W. Chancellor, Secretary State Board of Health, Maryland.
Dr. John T. Reeve, Secretary State Board of Health, Wisconsin.
Dr. C. N. Hewitt, Secretary State Board of Health, Minnesota.
Dr. Thomas J. Turner, Medical Inspector, U. S. N.

At the afternoon session Dr. Harris read "A Report on a Practical Method for securing Complete and Authentic Records of the Causes of Death throughout the United States." This paper was ordered to be published and submitted to the several State Boards of Health, with a view to their action on the subjects discussed.

The Secretary submitted special communications relating to the census, from Dr. J. S. Billings and Gen. F. A. Walker, which were referred to the Publishing Committee, with power.

The following papers were then read by title: "Water Supplies in Country Districts, Villages, and Large Towns, especially considering the subject of Filtration," by Dr. Thad. Stevens, of Indianapolis; "Ozone and Heat," by Dr. L. H. Cohen, Quincy, Ill.; "Sanitary History of the Establishment of a City," by Dr. A. N. Bell, of Brooklyn, N. Y.; "Safety in Railway Traveling," by Dr. Dunot, of Harrisburg, Penn. These papers were referred to the Publishing Committee, with power.

Dr. C. N. Hewitt read a paper on "The Work of Hygiene in the Education of the Children in the Common Schools, and in the Families and Society in which they Live." Referred to the Publishing Committee.

Dr. Folsom's resignation as Treasurer was read and accepted, and Dr. Henry B. Baker, of Michigan, was elected to fill the vacancy.

The subject of the time and place for the next meeting was referred to the Executive Committee, with power.

THE SEVENTH MEETING.

The seventh annual meeting was held in Richmond, Va., November 19–22, 1878.

First Day. — The Association convened at half past seven P. M., at, Mozart Hall, called to order by the President, Dr. Elisha Harris, of New York. Prayer was offered by Rev. Dr. Peterkin, of Richmond. Dr. S. P. Moore, of Richmond, introduced His Excellency, F. W. M. Holliday, Governor of Virginia, who delivered an Address of Welcome. During the remainder of the evening Governor Holliday occupied the chair.

Prof. J. L. Cabell, M. D., First Vice-president, made a brief address, introducing the President, Dr. Harris, who followed with the Annual Address.

Dr. John M. Woodworth, chief of the Marine Hospital Service, made a brief introductory statement, relative to the work of the Yellow Fever Commission in the Mississippi Valley.

Hon. Lewis H. Steiner, M. D., of Maryland, followed with an address on the objects of the American Public Health Association.

Second Day. — The Secretary read the following letter from the Governor of Tennessee: —

Executive Office, Nashville, Tenn., *November* 14, 1878.

Dr. J. D. Plunkett, *President State Board of Health.*

Dear Sir, — I rejoice to learn that Drs. Atchison, Lindsley, and yourself, with delegations from Memphis, Chattanooga, and other points in the State, will attend the next meeting of the American Public Health Association, and I regret that official business will prevent my own attendance. All I could hope to accomplish, however, by my own presence, would be to testify to the great and growing interest that is felt in the State of Tennessee in the adoption of measures for the prevention of disease, and the protection of the public health.

No discussion of the question has occurred in this State until a few months ago, and it is not surprising that we are far behind other States in the promotion of this great reform. I am clear that all that is necessary to secure proper legislation upon this subject is to provide for a general discussion of it, and convince the great body of the people from whose ranks the largest per cent. of victims is furnished to cholera and yellow fever epidemics, that they are the principal beneficiaries of a sound sanitary policy. When this lesson is learned by the people, a public sentiment will be created, and legislation and money will be provided, adequate in character and amount to secure the coöperation of all the State and full protection to the public health.

Do me the favor to thank President Harris for the cordial invitation extended to myself to be present at the Richmond meeting, and assure him and the members of the Association of my active sympathy with the noble work in which they are engaged.

I will thank you to extend to the Association an invitation to hold the next meeting at Nashville. You are authorized to offer the State Capitol as the place of meeting, with the assurance of unstinted hospitality on the part of the people of Tennessee.

Very truly yours, JAMES D. PORTER.

Dr. I. A. Atchison, on behalf of the Tennessee delegation, and in the name of the City Council of Nashville, indorsed the invitation extended by Governor Porter.

The following communication upon the same subject was submitted : —

RICHMOND, VA., *November* 20, 1878.

GENTLEMEN OF THE EXECUTIVE COMMITTEE : —

The American Public Health Association received this morning an invitation from his Excellency James D. Porter, Governor of Tennessee, to hold its next annual session in Nashville. As a native of the capital city of the State of Tennessee, I would humbly beg leave to add my testimony to the heartiness of the invitation extended, and would ask permission to offer the following of the many reasons that are apparent in behalf of its acceptance.

Although this meeting is held in a Southern State, it is the first and only time that the South has been thus honored. For five consecutive seasons have the meetings been held in the North. I regard it as asking only a part of our due to expect two consecutive sessions in the South. But enough of this : sanitary science is *not* sectional.

Sincerely hoping that this present session may accomplish much, if not the full tide, of success as regards the powers of sanitation to cope with so formidable an adversary as yellow fever, yet there are other epidemics equally as pestilential that have and will obtrude themselves upon our notice. Even during the past few months slight mutterings, indicating a cloud not of the magnitude of a child's hand, have been heard in the distant East, that may, before another meeting of the Association is held, envelop greater areas of our country in gloom and suffering. Nashville's citizens have once and again writhed in sorrow and anguish in the gloom and inexorable grasp of Asiatic cholera ; typhoid and malarial disease, diphtheria, and a host of preventible (?) endemic diseases stalk abroad in our land, in my own native State as elsewhere ; and, finally, hygiene is but just awakening an interest in the South. Let us strike while the iron is hot, rouse up an enthusiasm in so grand a cause, and go forward with its banner while we can.

And now, apologizing for intruding upon you, as well as endeavoring to add anything to the cordial welcome extended you by our chief executive through Prof. T. A. Atchison, chairman of the Tennessee delegation, I beg leave to remain, most respectfully, your humble servant, (Signed) DEERING J. ROBERTS.

By direction of the President, the Secretary then read the following resolutions, which had been passed by the Executive Committee, and which (as was explained by the President) required no action by the Association, the reading of them being simply for information.

Resolved, That all reports, papers, and other documents which are read and received by the Association shall become the property of the Association, and shall be filed with the Secretary of the Association, for such disposal as the Association or Executive Committee may direct.

Resolved, That when the yellow fever commission makes its report, the general report of the chairman of the commission shall first be read, and then laid over until the individual reports of the commission, and all papers referring to the subject of yellow fever, are read and received; after which the several reports and papers shall be appropriately referred without debate.

Resolved, That, after such reports and papers have been acted upon by the committee to whom referred, they shall then be before the Association for discussion.

Resolved, That all papers submitted to the Association, and not hitherto disposed of, shall be submitted to a sub-committee of three, who shall report the disposal to be made of such papers; viz., reading in full, by abstract, by title, or filing.

The committee announced under the last resolution was as follows: Drs. C. B. White, J. L. Cabell, and T. J. Turner.

Dr. S. M. Bemiss, of New Orleans, Chairman, then read the General Report of the Yellow Fever Commission.

At the conclusion of the General Report Dr. J. A. Cochran, of Mobile, read his report of investigations at Grenada, Miss.

Following the report of Dr. Cochran, Dr. Bemiss read a detailed history of the epidemic at Canton, Miss.

Dr. Lloyd Howard, of Baltimore, read his report of investigations at Baton Rouge.

Following Dr. Howard's paper, Dr. Bemiss read an account of the yellow fever at Port Gibson.

This was followed by an account of the yellow fever at Brownsville, also read by Dr. Bemiss.

At the evening session the following resolutions, which had been adopted by the Executive Committee, were read: —

Resolved, That a committee of seven members be appointed by the President, to which shall be referred, without debate, all resolutions, except such as propose national legislation, which committee shall report to the Executive Committee.

Resolved, That the committees on the various papers referred to them be requested to report to the Executive Committee the topics or propositions found suitable for discussion by the Association in General Meeting.

The following resolution, adopted by the Executive Committee, was given to the Press: —

Resolved, That the American Public Health Association, by its Executive Committee, disapproves and disavows the premature publication of the General Report of the Yellow Fever Commission in a New York morning paper.

The following committees were then announced by the President: —

On the General Report of the Yellow Fever Commission: Dr. Jno. S. Billings, U. S. Army; Dr. Jas. Berrien Lindsley, Tenn.; Dr. L. S. Joynes, Va.; Dr. S. O. Vanderpoel, N. Y.; Dr. J. G. Thomas, Ga.

On Dr. Bemiss's Papers: Dr. R. W. Mitchell, Tenn.; Dr. Geo. W. Sternberger, U. S. Army; Dr. S. Choppin, La.; Dr. C. W. Chancellor, Md.; Dr. R. A. Kinlock, S. C.

On Dr. Cochran's Papers: Dr. E. M. Snow, R. I.; Dr. E. L. Griffin, Wis.; Dr. T. A. Atchison, Tenn. (chairman); Dr. J. J. Dement, Ala.; Dr. Jas. A. Steuart, Md.

On Dr. Howard's Papers: Dr. Jno. Morris, Md.; Dr. O. S. Iglehart, Ala.; Dr. J. D. Plunkett, Tenn.; Dr. Thomas J. Turner, U. S. N.; Dr. Wirt Johnson, Miss.

On Colonel Hardee's Report: Col. W. E. Cutshaw, Va.; Dr. J. H. Rauch, Ill.; Dr. W. A. Mussey, Ohio.

On Resolutions: Dr. Edwin M. Snow, R. I.; Dr. C. F. Folsom, Mass.; Dr. Stephen Smith, N. Y.; Dr. A. L. Gihon, U. S. N.; Dr. Thos. L. Neal, Ohio; Dr. J. D. Plunkett, Tenn.

On the President's Address: Dr. Stephen Smith, N. Y.; Dr. E. M. Snow, R. I.; Dr. Ezra M. Hunt, N. J.; Dr. J. A. Steuart, R. I.; Dr. J. H. Rauch, Ill.

The following resolution, offered by Major W. T. Wolthall, of Mobile, was read, and referred to the Committee on Resolutions: —

Resolved, That a committee of members be appointed to prepare and recommend measures for the more efficient management and control of future epidemics — especially for the training, selection, and employment of skillful and trustworthy nurses.

Dr. Bemiss then read the detailed reports of the investigation concerning the yellow fever at Lake, Miss., at Yazoo City, at Milan, and at Vicksburg.

Dr. Cochran then read an account of the yellow fever at Holly Springs.

On motion, Dr. Sims was allowed to read the report of the yellow fever at Chattanooga, in place of Dr. Cochran, the latter complaining of being exhausted.

The Association then adjourned to meet at ten o'clock Thursday morning.

THIRD DAY. — A number of resolutions were presented, some being read in full, and some by subject only, all of which were referred to the Committee on Resolutions, without debate.

By Rev. Dr. Marshall, of Vicksburg : —

1. *Resolved*, That we respectfully urge upon the General Government of the United States the appointment of a commission of competent citizens, who shall be authorized to visit Havana for the purpose of investigating the rise and progress of the yellow fever; and that they shall be required to investigate what may be done, if anything, towards the purifying of ships leaving that port during their voyages, and what further may be done in addition to the present methods in use for the further improvement of the practical workings of an improved and general quarantine system.

2. *Resolved*, That the Government be urged to set apart a sum of money sufficient for the full and untrammelled employment of all the time and energies of such commission; and that such commission be composed of physicians, scientists, and laymen, who shall enter upon the work with as little delay as possible.

By Dr. Vanderpoel, of New York : —

Resolved, That it be earnestly urged upon the President of the United States to confer with the Spanish Government, and request the appointment of an international commission, who shall study yellow fever at Havana, its principal place of *endemicité*, with a view of adopting measures which shall eradicate its spread in that city.

By Dr. W. H. Beatty, of Mobile : —

Resolved, That a resident physician at each point where yellow fever prevailed be requested by this Association to give such information as he may be able to collect as to the origin and mode of spread of the late visitation, together with the mode of treatment found most successful.

By Dr. R. W. Mitchell, of Memphis : —

Whereas, There has been formed at Washington, under the direction of the Surgeon-general U. S. Army, one of the most valuable medical libraries in the world; and

Whereas, There has been prepared, under the same direction, the manuscript of an Index Catalogue of this library, which, if published, would more than double the practical utility of the collection, and which would be of the greatest value to all medical men and sanitarians, even if the library itself were not in existence; therefore be it

Resolved, That a committee of five be appointed to urge upon Congress the immediate publication of this catalogue, setting forth that such publication, in the opinion of this Association, is one of the most important steps which can be taken by the General Government to promote the interests of sanitary science, and aid investigations into the causes and prevention of diseases.

By Dr. Deering J. Roberts, of Nashville : —

Resolved, That this Association earnestly recommends the establishment of a chair of State Medicine and Public Hygiene in every medical institution of learning in the United States.

By Dr. E. M. Hunt, of New Jersey : —

Resolved, That this Association shall, by a committee, press upon the attention of the Government the need of such methods as shall enable the next census to secure vital statistics on a plan best adapted to aid in the study of questions as to Public Health.

By Dr. Albert L. Gihon, U. S. N. : —

Resolved, That the Executive Committee be directed to provide for the investigation and discussion at the next annual meeting of the most effective means for preventing the spread of venereal diseases.

By Dr. Granville Dowell, of Galveston : —

Resolved, That it is the opinion of this Association that the body does not reproduce the poison of yellow fever, and that without this poison being thrown off from the body of a yellow-fever patient the clothing, bedding, and rooms of such patients would not be infected, and therefore could not infect persons or things; but we recognize from its history and mode of spreading that if this poison is thrown off in an open and pure air the poison will be destroyed, or so diluted that it will not always affect persons in the same room or even sleeping in the same bed.

By Dr. Thomas F. Wood, Wilmington, N. C.: —

Recognizing the necessity of uniformity of action in all States of the Union upon matters concerning the Public Health, and fully appreciating that the machinery necessary to move a whole nation would be cumbersome, and could better be done by the separate action of the States represented in this Association, be it hereby

1. *Resolved*, That we hold it to be very important that Boards of Health be established in each State; that, to be effective, these Boards should be properly empowered to act, and that money should be placed at their disposal to further the steady and vigorous prosecution of the measures which the advance of sanitary art and science may point out as best for the furtherance of the public health.

2. *Resolved*, That a copy of these resolutions be sent to the Executive Department of every State in the Union, with a request that they be brought to the attention of the Legislature.

By Dr. McCaw, of Richmond: —

Whereas, It is confessed by all that every present known means of disinfection against yellow fever has proved a failure; and

Whereas, We know that a temperature below the freezing point will kill the germ of the disease; therefore, be it

Resolved, That a committee of   shall be appointed to devise an effective and simple method of producing artificial cold, to be applied to the disinfection of clothing, baggage, and other movable property, which may have been exposed to the yellow fever contagion.

Dr. McCaw's resolution was returned from the Committee, indorsed as follows: —

We appreciate the importance of this question, and respectfully recommend that it be referred to the Yellow Fever Commission for their consideration.

For the Committee,
EDWIN M. SNOW, *Chairman.*

By Dr. Atchison, of Nashville: —

Resolved, That Commissioners or others who may be hereafter charged with the investigation of yellow fever be requested to inquire into the local environments which determine the spread of yellow fever when the germ has been introduced.

By Dr. Greenville Dowell: —

Resolved, That we request the President and Congress of the United States to appoint a Commissioner to confer with the authorities of Brazil, and all the South American States that have been afflicted with yellow fever, for the purpose of effecting arrangements with such States that may prevent the spread of yellow fever, and especially its importation into the United States.

The following communication was presented by Dr. Morris, of Baltimore, and referred to the Committee on Papers, without reading: —

"On Saturday, the 9th of November, a committee appointed by the Maryland Academy of Science, and approved by the Academy of Medicine and the Baltimore Medical Association, consisting of Drs. J. R. Uhler, C. C. Bambaugh, and C. L. Oudesluys, waited on President Hayes with the following memorial: —

"TO THE PRESIDENT: The undersigned, a Committee appointed by the Maryland Academy of Science, most respectfully request you to transmit to Congress a message, asking an appropriation and authority to appoint a permanent Scientific and Medical Commission to study and report upon the nature, causes, treatment, and prevention of yellow fever, and allied epidemic diseases; said Commission to consist of twenty or more members chosen from the ablest chemists, physicists, microscopists, biologists, naturalists, and physicians, in the country, with power to select from their own number, and others, workers, in order that the disease may be systematically examined from different points of view, both by acclimated members on the spot and others in the various laboratories of our country.

"During the conversation that ensued the following important points were made: —

"1. That the active intervention of men of trained judgment and special qualifications is essential for success.

"2. That the investigation should be commenced at once, before another epidemic occurs, in order that the usual healthy condition of the air, water, food, vegetable and animal life in the infected districts may be accurately ascertained.

"3. That the investigation should be made by a large number of specialists, in order that many new methods may be tried.

"4. That a portion of this work can only be conducted in the various large laboratories of the country; hence a number of names of men possessing a national reputation, and connected with Harvard, Yale, the universities of Michigan, New York, Pennsylvania, Maryland, and Louisiana, Bellevue Medical College, Cincinnati Medical School, and the Surgeon-general's office, were suggested for appointment.

"5. The importance of systematic efforts was discussed, and the committee left with the assurance that the memorial would be acted upon, and with the request of the President that it should be widely made known in order that medical and scientific men may induce Congress to pass the bill."

Dr. Choppin, President of the Board of Health of New Orleans, read a paper concerning the recent visitation of yellow fever in that city.

Col. T. S. Hardee then explained the maps which had been prepared, and described the general situation and surroundings of New Orleans.

Dr. Richardson, of the University of Pennsylvania, read a paper concerning the results of microscopical observations on the pathology of yellow fever.

Dr. W. G. Austin, of New Orleans, read a paper concerning the epidemic of yellow fever in New Orleans in 1839.

Following this, Dr. Robert White, Jr., read a paper on "The Nature of Contagion: What is the Character of the Active Principle of Contagion by which certain Diseases spread, or are communicated from one Person to another?"

At the evening session the following modifications of resolutions before presented were referred from the Committee on Resolutions to the Committee on Legislation: —

1. *Resolved*, That the American Public Health Association very respectfully, but earnestly, urge the President of the United States to confer with the Spanish government, with a view to securing the appointment of an international commission of competent experts to investigate the cause of yellow fever at Havana, the principal place of its endemic prevalence, and to recommend measures for its prevention.

2. *Resolved*, That they respectfully petition Congress to appropriate a sufficient sum of money to conduct such an inquiry, on the part of the United States, in a thorough and exhaustive manner.

3. *Resolved*, That the President of the American Public Health Association for the ensuing year, and two other members, to be appointed by him, constitute a committee to act in behalf of the Association to present these resolutions to the President and Congress, and to urge upon them the adoption of measures, by both governments in coöperation, for the prevention of the occurrence of epidemicy of yellow fever, so far as is possible, or at least its importation into the United States.

The following from the Executive Committee were presented for information of the Association: —

1. *Resolved*, That the several committees appointed to report on the communication made by the Yellow Fever Commission shall consider, and they are hereby instructed to consider, all of those communications as merely preliminary verbal statements, and not as formal reports or papers presented to the Association.

2. *Resolved*, That the chairmen of these several committees are hereby constituted a separate committee, and directed to prepare, with the least possible delay, a few brief, clear propositions with regard to the cause and best methods of prevention of yellow fever, to serve as a basis of discussion in the body of the Association.

The following report was then read by Dr. Billings: —

REPORT UPON THE WORK OF THE YELLOW FEVER COMMISSION.

"The Committee to which was referred the General Report of the Yellow Fever Commission has examined said report, and respectfully returns it to the Executive Committee with the following remarks: —

"1. That it is evident that the Yellow Fever Commission has exercised great diligence in collecting data with regard to the late epidemic, and that its labors in this direction deserve the full approbation of the American Public Health Association.

"2. That the preliminary conclusions presented by the Commission are in accordance with the prevailing opinions of the medical profession of this and other countries, with the exception of that relating to disinfection.

"3. With regard to the method of investigation pursued by the Commission the Committee consider it as satisfactory, and in fact the only one which could have been employed, so far as the obtaining the history of this epidemic is concerned.

"4. It is believed to be of great importance that the investigation thus commenced should be made as thorough and complete as possible, in accordance with the methods of the Commission.

"But this Committee think it proper to observe that the investigation should take a much wider range, since what is desired is *to obtain, if possible, a knowledge of the cause of yellow fever, — a knowledge which the most complete history of the epidemic which can be made will not be able to furnish.*

"What is it that we hope to accomplish when we undertake to investigate the cause of a specific disease? What will be accepted by the medical profession and the scientific world at large as being a satisfactory demonstration of the cause of yellow fever?

"If yellow fever is, as we suppose, due to a specific material thing, some means is desired of recognizing the presence of that thing other than the fact of the occurrence of the specific disease in the human subject, — some test which will enable us to say, for instance, Here is a jar containing a substance which if inhaled or inoculated will produce yellow fever in a susceptible individual, and it will do this in any part of the country if applied under proper circumstances.

"To establish the fact that the material in the jar would do this would require numerous experimental verifications, which cannot be obtained upon human subjects, and hence one of the first things to be sought is some animal or organism in which it may be possible to produce either yellow fever or some specific and recognizable effect of the yellow fever poison. In the accounts of yellow fever epidemics are various allusions to accompanying phenomena observed in animal life. For instance, it has beeen alleged that unacclimated animals at such times become sick; that certain insects are unusually prevalent; that insects do not annoy persons who have had the fever, etc. Certain analogies between the yellow fever and the Texas or Spanish cattle fever have been pointed out, etc., but as yet the test mentioned has not only not been found, but it has not been methodically sought.

"It appears to us, however, that this is the first and most important step in the investigation, and that attempts to investigate the morphology, chemistry, and biology of the poison will be largely wasted until we have some easily applicable test to inform us as to when we have really got the poison to investigate.

"Having such a test, the next step is easy. If the current theories about yellow fever are correct, the yellow fever poison may be developed by adding some one or more of the excretions or fluids of a person affected with yellow fever to decomposing organic matter under well-known conditions of temperature and moisture. We have then to carry out a process of elimination, to find out what constituents of the decaying filth are essential and what non-essential, what secretions or excretions of the body are essential and what non-essential to the production of the poison, and at the same time to seek chemical or microscopical means of recognizing the presence of either the cause of the poison or the poison itself, in order to get rid, if possible, of the necessity of resorting to the physiological test of inoculation to prove its presence.

"In this brief sketch of what would be considered a satisfactory demonstration of the cause of yellow fever, but one provisional hypothesis, namely, the prevailing and popular one, has not been mentioned. Several others must also be considered and tested by the experimental investigator, but in each and all the greatest and first desideratum is an easily applied test of the presence of poison.

"It needs but a moment's reflection to see that the period when an epidemic is raging is not the time to carry on such researches.

"They must be made when the disease is not prevalent, and yet there must be cases of the disease at hand in order to furnish the material for experiment.

"Probably the best place to carry on such an investigation would be at first the city of Havana.

"It must be clear to all that the necessary investigation will require much time and labor, and that its results should be presented accompanied by clear and convincing evidence. Such evidence will not be the opinions of any one, nor mere descriptions of microscopic appearances, nor even camera lucida drawings. Photographs, photomicrographs, the original preparations, and similar evidence will be demanded.

"All of which is respectfully submitted."

The following communication was then read by the Secretary: —

RICHMOND, *November*, 21, 1878.

To the Secretary of the American Public Health Association: —

Sir, — Will you please read the accompanying letter to the Association, if you think proper, and say that I shall be pleased if physicians from the yellow fever stricken cities can give me the names and addresses of families of physicians who may be in need of help. I have already received $2,300.00 from the Citizens' Relief Committee of Brooklyn, for the relief of sufferers by the yellow fever.

Very respectfully, JOHN M. WOODWORTH.

The accompanying letter was as follows: —

BROOKLYN, N. Y., *November* 19, 1878.

DR. JOHN M. WOODWORTH, *Surgeon-general M. H. S.:* —

Dear Sir, — I am in receipt of your favor 15th inst., with inclosure, contents of which are entirely satisfactory. Some time since we wrote you concerning the families of deceased physicians, victims of the pestilence. We have thought you might possibly know of some who, from the same cause, are incapacitated for properly supporting their families. To such and to the families of the former we would extend relief, and for that purpose herewith inclose you check for $500.00, with the wish that you might use the whole or part of it in such service. If in your judgment such assistance is not feasible, then dispose of the amount in such manner as you deem proper.

Yours truly, RIPLEY ROPES, *Treasurer.*

Rev. Dr. Marshall, of Vicksburg, spoke in commendation of the letter. He recounted the suffering that existed in the yellow fever districts in the families of physicians, both of those who had fallen martyrs to their duties and of those who, though escaping death, had lost all resources for the time being. It seemed to the speaker that something solemn, dignified, and entirely appropriate should be done by the Association, in connection with this communication, either by committee or otherwise, but in any event to give it emphasis. Let the widows and the orphans know of that letter which has just been read in this assembly.

Dr. Hewitt indorsed the remarks just made, but thought it was well that the profession itself take into consideration the caring for families of deceased and needy physicians. He therefore moved that a committee of three be appointed to take into consideration what provision can be made by the profession for the relief of widows and orphans of physicians who have fallen victims to the scourge of yellow fever. The motion was seconded, put, and carried.

Dr. J. L. Cabell then read a communication from Hon. J. Randolph Tucker, on the powers of the General Government in regard to the prevention of the introduction of contagious diseases into the United States, and their spread from one State into another.

Dr. Ezra M. Hunt, of New Jersey, then gave an address, entitled "How to Study an Epidemic."

FOURTH DAY. — The President announced that the first business in order was the election of officers for the ensuing year. Whereupon the following were elected: —

PROF. JAMES L. CABELL, M. D., University of Virginia, Charlottesville, *President.*

JOHN S. BILLINGS, M. D., Surgeon U. S. Army, Washington, D. C., *First Vice-president.*

SAMUEL CHOPPIN, M. D., New Orleans, La., *Second Vice-president.*

HENRY B. BAKER, M. D., Lansing, Mich., *Treasurer.*

DR. E. H. JANES, *Secretary.*

Elected members of Executive Committee: —

C. B. WHITE, M. D., New Orleans. La.
T. J. TURNER, M. D., U. S. N., Washington, D. C.
E. M. HUNT, M. D., Metuchen, N. J.
J. D. PLUNKET, M. D., Nashville, Tenn.
C. F. FOLSOM, M. D., Boston, Mass.
C. N. HEWITT, M. D., Red Wing, Minn.

The Committee on Resolutions submitted the following report: —

"The Committee on Resolutions respectfully report that they have duly considered the inclosed resolutions, presented by Dr. Henry B. Baker, of Michigan, in relation to obtaining legislation by Congress on several subjects pertaining to the public health.

"While the Committee cordially approves of the subject matter of these resolutions, it still deems it inexpedient and unwise to commit the Association, at this critical period of public agitation of kindred topics, to any definite form of organization of a public health service. In our opinion, the objects sought can best be attained by the appointment of a suitable Committee on Legislation by the Association, which shall be empowered to secure the legislation necessary to the organization of an adequate public health service connected with the General Government. The Committee would suggest that in the organization of a legislative committee, each State represented in the Association should have a member, and that the chief medical officer of the Army, of the Navy, and of the Marine Hospital Service, and the Commissioner of Education, or such officer in their respective services as they may designate, shall be members, together with the President of the Association. This committee should have an Executive Committee conveniently located to act together during the session of Congress. To this legislative committee should be referred all resolutions or matters pertaining to Congressional action.

All of which is respectfully submitted.

EDWIN M. SNOW, *Chairman.*
STEPHEN SMITH."

The following are the resolutions of Dr. Henry B. Baker, referred to in the above report: —

1. *Resolved*, That this Association heartily approves and earnestly recommends the adoption of the proposition of Surgeon J. S. Billings, U. S. Army, as set forth in a communication dated October 15, 1878, from J. K. Barnes, Surgeon-general U. S. Army, to the Hon. S. S. Cox, M. C., Chairman of the Committee on Census of 1880, and which proposition is, that statements of certain specified facts relating to the health of the people shall be collected in the coming Census.

2. *Resolved*, That the Secretary of this Association be directed to transmit a memorial to Congress, or a respectful communication to the Hon. S. S. Cox, M. C., Chairman of the Committee on Census of 1880, or to the proper officers who shall be charged with the control of the U. S. Census of 1880, setting forth the importance of having the statistics relating to the sickness and deaths, and all other vital statistics of the inhabitants which may be collected by the Census, collated, digested, and compiled, under the supervision of an expert in vital statistics and sanitary science; to the end that statistics collected at such cost, and which are of such vital importance to the people, shall not be made valueless by reason of unskillful compilation, but as useful as they can be made by a practical statistician familiar with the sanitary problems of the day.

3. *Resolved*, That, in the interests of public health and the prosperity of this country, it is desirable and important that the facts and data bearing upon public health subjects which are collected by the Census, and constantly being collected by the several departments of the General Government at Washington, shall be systematically utilized and made practically available as aids to all proper efforts by Congress, Legislatures, Boards of Health, associations, and individuals, for the better protection of the lives, health, happiness, and prosperity of the people of the United States.

4. *Resolved*, That, for the accomplishment of the purpose suggested in the preceding resolution, this Association approves of the proposition for the formation of a permanent

"United States Public Health Commission," charged with the duty of collating and utilizing all such information directly or indirectly relating to the public health as shall be gathered in the several departments of the General Government of the United States; this commission to make to the President or to Congress an annual report which shall embody such facts and information relating to public health as may be collected and be considered important to be included in such report, and otherwise to collect and disseminate useful information relating to public health in such manner as shall best advance the interests of the people of the United States, — the amount of money appropriated for such purposes being limited by Congress, and the Commission to be constituted as follows: —

The Surgeon-general of the Army (representing the War Department).

The Chief Signal Officer of the Army (representing the War Department).

The Surgeon-general of the Navy (representing the Navy Department).

The Surgeon-general of the Marine Hospital Service (representing the Treasury Department).

The Commissioner of Education (representing the Interior Department).

The Superintendent of the Census (representing the Interior Department); and

A permanent secretary and executive officer, who shall be a citizen of the United States, shall be chosen by the above-mentioned members of the Commission (but may be nominated by this Association), and who shall be selected for his executive ability, and especially for his expert ability in vital statistics and sanitary science, and whose duty it shall be to constantly attend to the duties of the office, and have immediate charge of the work of the Commission at the Capitol.

Whereas, Meteorological data of the right kind, and sufficient for the determination of the conditions under which yellow fever or any other epidemic occurs, have not been, are not now, and probably will not be collected, except it be done by the National Government; therefore, —

Resolved, That the permanent National Sanitary Commission should be especially required to utilize the meteorological data now collected, and to inaugurate a system of meteorological observations and reports by which it can learn the condition of the atmosphere at every season of the year in different parts of the United States, as regards relative amount of ozone, kind and amount of electricity, and such other facts of this nature as may promise aid in the study of the causes of epidemic and other diseases.

Resolved, That a committee, of which the President of the Association shall be chairman, be appointed to represent this Association on the subjects upon which Congress is to be memorialized; the duties of the committee to be to consult with the officers whom it is proposed shall constitute the National Public Health Commission, and to frame a bill, in accordance with the resolutions adopted by this Association, for presentation to the proper Congressional Committee, and to present to such committee facts and considerations showing the national importance of legislative action, inaugurating more effective measures for the prevention of sickness and deaths from removable or avoidable causes, and explaining more definitely than can be done in brief resolutions what is hoped to be accomplished through the establishment of a permanent National Health Commission.

Resolved, That the interests of public health and safety in these United States will be promoted by the establishment of State and National Examining Boards, not connected with medical schools or colleges, but under governmental direction, whose duty it shall be to examine applicants for degrees in sanitary science, and public hygiene, and to confer such degrees only upon such as on examination are found learned in such specialties; that this will promote accuracy in these studies, will stimulate many to become proficient, will create a demand for increased efforts for the teaching of sanitary science, and such "knowledge of most worth" by schools and colleges, and, finally, that it will make it possible for State and city officers to select health officers and members of boards of health from a class of persons whose proficiency in sanitary science has been ascertained by those competent to judge.

Resolved, That in order to insure that such Examining Boards shall be formed of competent persons, such State Examining Boards shall be formed and controlled by the State Boards of Health, and the National Examining Board by the permanent National Public Health Commission; which may be economically done by the assignment of Army, Navy, and other medical officers of the government to act with sanitary experts from civil life (as suggested by Dr. Busey, member of this Association).

Resolved, That in transmitting to Congress the memorials and resolutions of this Association, the officers or committee of this Association shall include a respectful memorial to the United States Senate and House of Representatives, praying for the establishment of a standing committee on public health in each legislative branch of the government, and respectfully suggesting, as a reason therefor, that the needs of the people for protection to "life, liberty, and the pursuit of happiness" from preventable causes of sickness and death are real and more constant than their need for protection from armed foes, against which the government protects by the Army and Navy, to which departments Congress gives much attention, in its general sessions as well as in its standing committees.

The following report of the Committee to whom Dr. Bemis's papers had been referred was read by the Chairman, Dr. Mitchell : —

"The Committee report that an examination of the documents submitted to it by Dr. S. M. Bemis shows that this gentleman has collected an amount of valuable evidence relating to the origin and development of recent epidemics of yellow fever at Canton, Miss. ; Lake, Miss. ; Vicksburg, Miss. ; Port Gibson, Yazoo City, Miss. ; Brownsville, Tenn. ; and Milan, Tenn., which, in consideration of the brief time at his disposal, is truly surprising. This evidence is of the highest value, and should, in the opinion of this committee, be published at an early date, so that the facts elicited may be within the reach of those interested in epidemiology.

"From a very hasty examination of this evidence the committee cannot find that there are any uniform local conditions. Yellow fever has prevailed in cleanly places and in filthy places, in high places and in low places, among the rich and the poor.

"Besides the constant factors of summer heat and atmospheric conditions common to the whole section in which the disease has prevailed, there seem to be but two conditions essential to the production of an epidemic. One, the introduction of the *materies morbi* from some foreign source, and the other, the presence of persons susceptible to the disease. It is noticeable that the first cases have, in several towns, occurred near the railroad depot or steamboat landing.

"Some very interesting facts relating to the recurrence of cases in certain localities, soon after the hanging out of bedding, for the purpose of airing, which had been in use by yellow fever patients, are given in these reports.

"The Committee is of the opinion that the work, so well commenced, should be continued under the auspices of the General Government, and would suggest that, in prosecuting this investigation, especial attention be given to the possibility of the infective material being conveyed in goods or clothing, other than the clothing or bedding of yellow fever patients, or by persons who, being personally protected, do not attract attention to themselves because of the fact that they do not fall sick with yellow fever."

It was moved that the incoming Executive Committee proceed at once with the publication of Volume IV., and also, as soon as practicable, with Volume V. of the Proceedings of the Association. Carried.

The committee to whom Dr. E. Lloyd Howard's report had been referred then made report as follows : —

"Dr. Morris, from the committee to which was referred the papers of Dr. E. Lloyd Howard, begs leave to report : —

"That inasmuch as Dr. Howard's report is merely a preliminary and statistical one, and consequently incomplete, no action concerning it is at this time deemed necessary. The completion of the report is, however, of the greatest importance, with a view to its future publication by the Association."

The Committee on Colonel Hardee's Report then reported as follows : —

RICHMOND, VA., *November* 21, 1878.

Your Committee appointed to consider the report referred to them beg to state that in their opinion the Map and description of New Orleans, as presented by Colonel Hardee, are valuable contributions of data to this Association, and should be embodied in a report of its transactions for future use and reference ; that it is desirable to have this report supplemented by such details of topography, drainage, water supply, surface and underground street work, and modes of executing the same, as will enable this Association to study the exact condition of New Orleans in its relation to sanitary science.

They therefore recommend that Colonel Hardee be requested to submit to this Association a full written report, together with Map and profiles, embracing the views verbally explained to the Association this day.

They also recommend that similar data be solicited of other cities and towns within the yellow fever district; and that all maps and descriptions be arranged to accompany the special reports and observations made upon each city and town throughout the district under consideration. Respectfully submitted,

W. E. CUTSHAW, *Chairman Committee.*

The Committee on subjects for discussion reported as follows, through Dr. Billings, chairman: —

"The Committee appointed to prepare propositions on yellow fever to serve as a basis for discussion in the body of the Association, has the honor to submit herewith some queries for that purpose: —

"1. In case of the occurrence of an epidemic of yellow fever in a community unprotected by previous attacks, how are the well to be disposed of, and what organization and measures are desirable to afford relief?

"2. When should yellow fever be declared epidemic in a community?

"3. Can yellow fever be transmitted by personal contagion, independent of clothing and fomites of every description?

"4. Can yellow fever spread in a place which is and has been previously in a perfectly sanitary condition?

"5. Can any known disinfectants be relied on to arrest the progress of yellow fever in a city or village?

"6. What are the best methods of disinfecting?

"7. What influence has the daily thermometric, barometric, or hygrometric range, or both, in promoting or retarding the spread of yellow fever in a community?

"8. Are any measures of personal prophylaxis of service?

"9. Is it possible and desirable to establish such a maritime quarantine for the Southern Atlantic and Gulf coasts of the United States as is necessary to secure immunity from the importation of yellow fever?

"10. Is it possible to secure such a quarantine without placing it under the control of the General Government?

"11. In case of the arrival of a vessel believed to be infected with yellow fever, what course should be pursued with the passengers, the baggage and freight, and the ship?

"PROPOSITIONS.

"1. Yellow fever is a specific disease, not indigenous to, or originating spontaneously in, the United States, and its appearance in this country is always due to a specific cause.

"2. Quarantine established with such rigor and precision as to produce absolute non-intercourse will prevent the importation of the specific cause of yellow fever.

"3. It is the duty of the General Government to aid in the establishment of a practical and proper quarantine by all means in its power.

"4. It is the duty of the General Government to appoint a Commission of experts to make a thorough investigation into the causes of yellow fever, and the best methods of preventing its introduction into this country, and to make such an appropriation as will permit of the securing the services of the best men, and of the best means for carrying out such investigation.

"5. That it is the duty of the General Government to invite foreign nations to coöperate with it in the establishment of uniform and effective international quarantine regulations."

On motion the following additional proposition was added to the list: —

"6. That whatever may be the practical value of quarantine, there is no doubt of the importance and value of internal sanitary measures in the prevention or modification of epidemic yellow fever, and that this Association strongly urges upon State and municipal authorities the great amount of responsibility which rests upon them on this account at times when no disease is prevalent or threatening."

On motion it was ordered that this list of queries and propositions be printed and distributed by evening.

Upon motion of Dr. Billings it was agreed to proceed to the consideration of resolutions which had been returned from the Executive Committee. The Secretary then read as follows : —

1. *Resolved*, That in the deliberate judgment of this Association it is the duty of every State to establish and adequately maintain an efficient State Board of Health, and to as great an extent as practicable to contribute to the protection of the public health within its own commonwealth, and by all suitable means to that of the whole country.

2. *Resolved*, That the powers and duties of the State Boards of Health should be so well defined by law, and so fully provided for in the polity of State administration, that the sanitary interests and protection of all places in the States should be secured.

3. *Resolved*, That a copy of these resolutions, with a suitable official memorandum as a basis of correspondence, shall be transmitted to each State Board of Health and each Governor in our country, to the health officers of ports, and to the government of each State and port, that may be concerned in the duties of such mutual efforts for sanitary protection.

Each resolution was voted upon separately after reading, and was adopted.

The following resolution, being of the same series, was referred by the Committee on Resolutions to the Committee on Legislation : —

Resolved, That in the efforts to obtain the aid or interposition of the Federal Government, for any general and specific kinds of sanitary protection of the United States against pestilential and infectious diseases, the State authorities should have effectual and prompt methods of united action to insure the desired sanitary protection and improvement, whether or not the national agencies lead, assist, or impart unity and effectiveness to the sanitary service of the States.

It was moved by Dr. Gihon that discussion on yellow fever papers, etc., be made the order of the day at one o'clock. Carried.

It was voted that the Constitution and a complete list of members be immediately printed, and two copies furnished to each member.

It was voted that in discussion gentlemen be limited to ten minutes each, until all who desire to take part shall have spoken.

The following resolution was read and adopted : —

Resolved, That a committee be appointed to advise with the Executive Committee of this Association with regard to matters of legislation coming before Congress during the next session, which relate to the subjects of Public Health, and that this committee be composed as follows : viz., one member from each State represented in the Association, the chief medical officer in the Army, in the Navy, in the Marine Hospital Service, the Commissioner of Education, or such officer in these respective services as they may designate ; and that to this committee be referred all resolutions and motions relating to the subject matter of the resolutions which have been or may be presented to this Association ; the members of this committee to be appointed by the Executive Committee of this Association, after consultation as far as possible with the representatives of each State and the District of Columbia in this Association ; and they shall report to the Executive Committee any advice which they may have to present. And this Association instructs the Executive Committee to exert its influence to secure such legislation as will best protect the public health of the whole country.

The resolution concerning the publication of the catalogue of the medical library belonging to the office of the Surgeon-general of the army was then taken up, and voted affirmatively.

Dr. J. S. Billings rose to make some explanations concerning a proposition originating with him in regard to incorporating into the National Census of 1880 statistics of diseases as well as of deaths. The following resolution had been reported favorably from the Committee on Resolutions : —

Resolved, That this Association heartily approves and earnestly recommends the adoption of the proposition of Surgeon J. S. Billings, United States Army, as set forth in a communication dated October 15, 1878, from J. K. Barnes, Surgeon-general United States Army, to the Hon. S. S. Cox, M. C., chairman of the Committee on the Census of 1880, and which proposition is that statements of certain specified facts relating to the health of the people shall be collected in the coming census.

It was moved by Dr. Baker that the above resolution be passed by the Association in general session, thus relieving the Executive Committee of further consideration of the subject.

It was moved by Dr. Snow that a printed copy of the correspondence concerning this subject, which Dr. Billings had read in the course of his remarks, and which embodied his scheme of questions, etc., be attached to the resolution.

The following is the correspondence referred to : —

WAR DEPARTMENT, SURGEON-GENERAL'S OFFICE,
WASHINGTON, *October* 15, 1878.

TO THE HON. S. S. COX, M. C.,
Chairman Committee on Census of 1880, Washington, D. C.

Sir, — I have the honor to inclose a communication from Surgeon J. S. Billings, U. S. Army. It would be impossible to state in too strong terms the great additional value which his suggestions, if fully carried out, would give the next Census Reports, and I ask for them the favorable consideration of the Committee.

Very respectfully, your obedient servant,
(Signed) J. K. BARNES, *Surgeon-general U. S. Army.*

WAR DEPARTMENT, SURGEON-GENERAL'S OFFICE,
WASHINGTON, *September* 28, 1878.

GENERAL JOSEPH K. BARNES, *Surgeon-general U. S. Army.*

General, — I have the honor to submit the following suggestions with regard to the approaching United States Census, and to request that if they shall seem to you worthy of attention they may be brought to the notice of the Congressional committees which now have the subject under consideration.

Having been consulted on certain points relating to the Mortality Statistics of the last census, I have given special attention to their probable value as affording a means of judging of the condition of the public health, and of the prevalence of certain causes of disease in different localities, and, as a result of this examination, it appears to me that, interesting as they are, it would be possible to obtain data much more valuable, from both a scientific and economic point of view, in relation to the health of the people of the United States.

As is pointed out by the Royal Sanitary Commission of England, "however complete the registration of deaths may be, it cannot give a fair estimate of the sickness which is not fatal, it cannot indicate where or how these are to be prevented, it cannot tell the cost which it is worth incurring for their diminution."

It is probable that results of the greatest interest and value might be obtained from a record of sickness, and especially of those forms which are known to be due to contagion or to special local conditions.

So far as I can learn the only attempts to obtain a registration of disease in connection with a national census have been made in Ireland, where the disease with which each individual is suffering on the day of the count is recorded; and in Portugal, where a query is inserted as to sickness, but in what precise form I have not been able to ascertain.

As chairman of the section of Hygiene and State Medicine of the American Medical Association, I have corresponded with a number of the members of the section and with other skilled sanitarians, all of whom unite in the opinion that it is possible in the next census to obtain some data with regard to disease which will inaugurate a new branch of statistics in this country, and that it is highly desirable that the general government should take the lead in this matter.

The principal difficulty has been to obtain substantial agreement as to the questions upon which information is most desired, keeping in view the fact that these questions are to be asked and answered by unprofessional men.

As the result of the conferences above alluded to, and of careful study of what is practicable, as well as what is desirable, I venture to suggest the following five queries as being, if not the best, at least such as will bring out a vast amount of information which will be extremely interesting and useful to the political economist, the sanitarian, and the physician.

The amount of information which moderately complete answers to them will give is not to be estimated from the questions themselves only; for it should be remembered that of each individual to whom these queries apply, the age, sex, color, parentage, and occupation are also recorded in the schedules now in use, and hence the influence of these conditions, separate or combined, upon the diseases to which my proposed queries relate can be made to appear in various ways.

The queries suggested are as follows: —

1st. Number of days during past year in which the person was unable to follow his or her usual occupation on account of disease (D) or injuries (I). (Attendance at school considered as an occupation.)

2d. Is the person sick on the 30th day of June, if so, name disease or injury.

3d. Is the case being treated in hospital (H), by a physician from a dispensary or public charity (C), by a private physician (P), or without a physician (N).

4th. Has the person during the past year had any of the following diseases, namely: Small-pox or varioloid (S Pox, V); scarlet fever (Sc); measles (Me); diphtheria (D); typhoid fever (T F); malarial fever (M F), (includes ague, bilious fever, and remittent fever); yellow fever (Y F); acute lung diseases (L D), (includes lung fever, pneumonia, and pleurisy); acute rheumatism (A R); cerebro-spinal-meningitis (C S M).

5th. What has been the cost to the person (or head of the family on his account) during the past year from sickness, in — *a.* Loss of wages or salary? *b.* Cost of medical attendance, medicines, and nursing?

These queries, for the most part, are self-explanatory. The second question is that used in the Irish census, the name of the disease being entered in the person's own words (in Ireland it is often entered in Irish), leaving it to an expert at the central office to classify it as best he can. The fifth query can, in most cases, be answered only approximately, but for the working classes, at all events, the answers will be near enough to the truth to be of value. Very respectfully, your obedient servant,

(Signed) J. S. BILLINGS, *Surgeon U. S. Army.*

The question was then put, with the amendment of Dr. Snow, and was lost. The resolution passed into the hands of the Executive Committee for further consideration.

Dr. S. S. Herrick, of New Orleans, read a paper entitled, "Propositions relative to the Etiology of Yellow Fever."

Dr. D. E. Halliday, of New Orleans, read a paper: "Is Efficient Quarantine Possible or Practicable?"

Dr. George M. Sternberg, U. S. Army, read a paper on the importation theory, and in favor of national quarantine.

Dr. Vandeman read a paper on yellow fever in Chattanooga, Tenn.

Medical Inspector Albert L. Gihon said: I desire to put on record the experience and the opinions based on that experience of the medical officers of the navy, which I am here to represent by the authority of the Surgeon-general of the Navy. I believe them to be their unanimous opinions. If there are any dissentients, I have never met them.

1. The yellow fever ship is always a foul ship.

2. Foul ships, while often generating by their filth other endemic diseases, have never developed yellow fever *de novo.*

3. When a foul ship visits a port where yellow fever is prevailing, communication with that place will cause the development of yellow fever among its crew.

4. A clean ship may visit a yellow fever port, and by rigorously abstaining from all communication with that place escape yellow fever contamination.

5. When yellow fever appears on board a ship, the only safety for the well is to get them out of the ship.

6. The sick can also be removed from the ship (provided clothing and bedding is not also removed) with entire impunity to those among whom they are received.

7. Nurses and attendants upon the sick, with yellow fever aboard ship, are not more liable than the other occupants of the ship to contract yellow fever.

8. When yellow fever appears on board a ship, it is possible to imprison it by fastening down the hatches, boarding them up, and imperviously caulking every outlet for emanations from below, the crew being restricted to, and sleeping in, the open air of the spar deck, abstaining from the use of food, drink, or clothing, which have been below.

9. If this ship is removed to a locality where bad sanitary conditions prevail, and any of its contents discharged, it will inevitably disseminate yellow fever.

10. It is believed that localities to leeward of currents of air from a ship infected with yellow fever may be infected thereby.

11. Freight, food, baggage, clothing, etc., must remain undisturbed on board, until the lower decks have been exposed to a prolonged continuance of extreme cold weather.

12. No ship on which yellow fever has prevailed can ever be safely inhabited until after a similar protracted exposure to freezing weather.

13. It is believed, but not entirely demonstrated, that thorough permeation of the ship by dry superheated steam will destroy the germ of yellow fever.

14. It is our belief that yellow fever is due to a specific living germ, of which the vitality may be impaired or wholly destroyed by extreme cold, and which germ rapidly propagates itself when deposited in a *nidus* of visible or invisible filth.

Dr. Selden, of Norfolk, then read a paper on "Prevention of Yellow Fever."

The Association then adjourned.

Evening Session. — The President, Dr. Harris, in the chair.

The President announced the Committee which had been elected to petition Congress for the publication of the Index Catalogue to the Library of the Surgeon-general U. S. A., as follows: Dr. R. W. Mitchell, Tennessee (Chairman); Dr. H. I. Bowditch, Massachusetts; Dr. S. M. Bemis, Louisiana; Dr. Wirt Johnson, Mississippi; Dr. Henry B. Baker, Michigan.

The Secretary then read several names of persons proposed for membership, who, on motion, were elected: Governor Carroll, of Maryland; Dr. A. M. Fauntleroy, Staunton, Va.; James H. Gilmore, Marion, Va.: Mrs. Elizabeth Thompson, New York; Dr. J. R. Ward, Maryland.

The Secretary then read the resolution, providing for an Advisory Committee, adopted at the morning session.

The President then announced the following Committee Advisory to the Executive Committee on National Legislation: Dr. R. H. Webb, Alabama; Dr. Henry Gibbon, California; Dr. J. P. Wall, Florida; Hon. J. G. Thomas, M. D., Georgia; Dr. J. H. Rauch, Illinois; Dr. Geo. Sutton, Indiana; Dr. Wirt Johnson, Mississippi; Hon. L. H. Steiner, M. D., Maryland; Dr. H. I. Bowditch, Massachusetts; Dr. J. Howard Taylor, Pennsylvania; Dr. Thomas C. Minor, Ohio; Prof. J. T. Hodgen, Missouri; Dr. E. M. Snow, Rhode Island; Dr. T. A. Atchison, Tennessee; Dr. L. S. Joynes, Virginia; Dr. H. O. Hitchcock, Michigan; Dr. J. C. Reeves, West Virginia; Dr. Joseph M. Toner, District of Columbia; Hon. Dorman B. Eaton, New York; Dr. Robert Libby, South Carolina; Dr. Thomas F. Wood, North Carolina; Dr. G. C. Chamberlain, Connecticut; Dr. S. P. Conn, New Hampshire; Dr. H. D. Holton, Vermont; Dr. A. R. Kirkpatrick, Texas; Dr. E. L. Griffin, Wisconsin; Dr. D. W. Hand, Minnesota; Hon. Samuel Lilly, M. D., New Jersey; Dr. R. G. Jennings, Arkansas; Dr. T. A. McParlin, U. S. Army; Dr. B. F. Gibbs. U. S. Navy; Dr. S. Hebersmith, U. S. M. H. Service.

The Secretary read Dr. Billings's resolution concerning health statistics, to be included in the new Census, which had been acted upon by the Executive Committee. On motion it was adopted by the Association.

Dr. Steiner then offered the following resolution, which was adopted: —

Resolved, That a committee of three be appointed to urge upon the Special Committee of Congress, now engaged upon the organization of the next Census, the great importance to public health of the subject of the above resolution.

The following gentlemen were appointed upon said Committee: Dr. L. H. Steiner, Dr. E. M. Hunt, Dr. Elisha Harris.

The Committee to which was referred the Report of Dr. Cochran presented the following report: —

Your Committee, to which was referred the Report of Dr. Jerome Cochran, covering his investigations in Oysica, Port Eads, McComb, Jackson, Grenada, Water Valley, Holly Springs, and Grand Junction, Mississippi; Decatur, Alabama; and Chattanooga and Memphis, Tennessee, note, —

First. The Herculean labor performed in so short a time.

Second. The great number of facts bearing on the spread of yellow fever, by which the scientific literature of the subject is enriched.

But your Committee have not failed to recognize the tentative character of the investigation, in the absence of thorough observation of those meteorological and terrene conditions which it is to be hoped may ultimately enable us to determine why the germ of yellow fever will fructify in one locality and not in another.

We earnestly recommend that the labors of an investigator, so able and zealous, be continued until all the facts are gleaned from this vast field of observation.

T. A. ATCHISON, *Chairman.*

The President called attention to the proposed amendments to the Constitution reported by the Committee on the President's Address, which are as follows: —

PROPOSED AMENDMENTS TO THE CONSTITUTION.

This notice of the proposed change in the Constitution is given in accordance with Section XIII.

Article III. to be amended so as to read as follows: —

MEMBERS.

There shall be two classes of members, viz.: (1) the members of State Boards of Health, ex officio; (2) elected members who shall be selected with special reference, etc.

IV. to be amended so as to read as follows: —

OFFICERS.

IV. The officers shall be a President, a Vice-president, a Secretary, a Treasurer, and a Foreign Corresponding Secretary.

All the officers shall be elected by ballot annually, except the secretaries, who shall be elected for a term of three years.

VIII. to be amended so as to read as follows: —

THE COUNCIL.

VIII. There shall be a Council, to be composed as follows, viz.: Of the President, the Vice-president, the Secretary, and the Treasurer, and of one member from each State Board of Health as appointed by said boards, and of an equal number of members to be elected by the Association, and a representative from the medical service of the Army, of the Navy, and of the Marine Hospital Service.

THE EXECUTIVE COMMITTEE.

IX. There shall be an Executive Committee, which shall consist of the President, the Vice-president, the Secretary, the Treasurer, the past Presidents, and five other persons whom the Council shall elect from their own number, at least two of whom shall be from the elected members of the Council. Five members shall constitute a quorum of this Committee.

IX. to be amended so as to read X.

THE DUTIES OF THE COUNCIL.

XI. The Council shall at each Annual Meeting make to the Executive Committee any recommendations it may deem proper. It shall also obtain such reports from State Boards of Health and from States not having boards, as shall secure the objects of the Association.

XI. amended so as to read XII.
XII. amended so as to read XIII.
XIII. amended so as to read XIV.
XIV. amended so as to read XV.

It was stated that according to the provision in the Constitution these proposed changes would be printed and promptly placed in the hands of members for consideration against the next annual meeting, when they will come up for vote.

The following resolution, proposed by Dr. Chancellor, of Baltimore, was then adopted: —

Resolved, That The American Public Health Association returns its grateful thanks to His Excellency the Governor of Virginia; to the local Committee of Arrangements, and the citizens generally of Richmond; to the Press of this and other cities, and to the authorities of the various lines of railway, for the courtesies which they have respectively extended to the members of the Association, especially the authorities of the Piedmont Air Line, which gave free transportation each way to all members and delegates traveling over their road between New Orleans and Richmond.

Dr. J. D. Plunket, of Nashville, then read a paper on "The Disinfection of Sewers by Ozone."

The propositions which had been prepared and printed were then called up for vote. Several modifications of the first proposition were proposed, resulting in the adoption of the following substitute, offered by Dr. Gihon and seconded by Dr. Choppin: —

"Yellow fever, in 1878, was a specific disease, not indigenous to or originating during that year in the United States, and its appearance in this country was due to a specific cause."

The other propositions were then voted upon separately, and adopted.

Dr. Snow then offered the following resolution, which was unanimously adopted: —

Resolved, That the heartfelt thanks of this Association, and of the whole people of the country, are due to Mrs. Elizabeth Thompson, of New York, and to other philanthropic individuals and associations, who by their liberal contributions have enabled the Yellow Fever Commission to prosecute its investigations; and also to those who have been concerned in organizing the work of the Commission, and in presenting the results of its work to this Association.

The following papers were read by title: Prophylactic Treatment of Individuals, Dr. E. M. Hunt, Secretary State Board of Health, N. J.; Geographical Elements in the Etiology of Yellow Fever, etc., Dr. Henry Hartshorne, of Philadelphia; Epidemic of 1878, with Meteorological Synopsis, Dr. C. J. Spinzig, of St. Louis; On the Relations of Water Supply and Typhoid Fever at Rochester, N. Y., Dr. Charles Buckley, Health Officer of Rochester, N. Y.

The Association adjourned *sine die.*

The present volume contains the proceedings of the eighth and last meeting of the Association, which need not be repeated in this connection. The more important papers read and discussed at these several meetings have been collected and published in five volumes.

It is proper in this place to acknowledge the indebtedness of the Association to its first Secretary, DR. ELISHA HARRIS, of New York. It was largely due to his unselfish devotion to its interests, during the early period of its existence, that the Association's final success was assured.

In reviewing the history of the Association several facts appear so prominently as to demand especial comment.

First. In the plan of organization the membership was selected by the Association, and not made up by representatives from existing voluntary bodies, or civil or sanitary authorities. This method of securing members renders the membership very select. The candidates are required to have an "acknowledged interest in, or devotion to, sanitary studies and allied sciences, and to the practical application of the same." Although a society thus constituted must have a limited attendance at its meetings, yet the quality and quantity of its work is necessarily greatly enhanced. This fact is noticeable in the uniformly highly scientific and practical character of the papers presented and discussed.

Second. The public interest in sanitary subjects was encouraged by popular meetings during the evenings of the session of the Association which were conducted by the leading citizens of the respective cities where the sessions were held. These meetings were addressed by the ablest public speakers in the country on topics of special interest to the public. They were always largely attended, and through them peculiar emphasis was given to the more scientific and practical work of the Association.

Third. The influence of the Association on the progress of sanitary reform in this country is undoubtedly recognized in the rapid multiplication of boards of health, and the intense popular interest in regard to the causes and prevention of epidemic and domestic pestilences. When the Association began its career, boards of health were few, and comparatively feeble and inefficient. Now a municipality without a well-organized sanitary board is the exception. And these boards are, in general, aggressive in their work, but judicious in the administration of the large powers which sanitary laws confer. State Boards of Health have also multiplied rapidly, and scarcely another five years will elapse before each State will have its central sanitary authority. But the most conspicuous example of the immense progress in the organization of sanitary work in this country is the creation of a National Board of Health, by Congress. Although this body owes its existence directly to the great epidemic of yellow fever of 1878, yet even the impressive lesson which that scourge taught the nation would have been lost, had not the American Public Health Association timely gathered the facts bearing on the origin and mode of propagation of the epidemic, and laid them before Congress. These facts, and the logical deductions drawn from them, convinced our legislators that their plain, practical duty was to create a central board, through which the general government could coöperate with state and local boards, in the prevention and suppression of contagious and infectious diseases. This act of Congress elevated the public health service of the United States to a position not inferior to that of the most favored nations of the world.

Fourth. The publications of the Association have now reached the fifth volume. The papers in these volumes are of the highest practical value, and have had a marked influence on the public mind. They have given to the series a permanent reputation, at home and abroad, among students of sanitary science. In style of publication they have taken the first rank, and have been regarded as models of typographical excellence.

Beneficent as has been the work of the Association, and important as are the reforms which it has achieved, it can but be in the infancy of its usefulness. However perfectly our system of public health service may become organized there will always be need of consultation and coöperation among those devoted to official duties, as also the discussion of theoretical and practical subjects by sanitary students. The opportunity for such consultation, coöperation, and discussion is afforded by the annual meetings of an Association whose membership embraces no hostile elements, but represents the best thinkers and workers in the field of scientific and practical sanitary inquiry and administration. In the capacity of a National Sanitary Congress the American Public Health Association must therefore continue to lead in the initiation of new measures and methods of reform, in encouraging the formation of efficient boards of health wherever required, and in fostering scientific inquiries. Through its agency state or preventive medicine in the United States will be purified of the vague speculations and false theories of the past, and established on the firm basis of a rational and accurate physiology, pathology, and etiology.

REPORTS AND PAPERS,

WITH ABSTRACT OF THE RECORD OF PROCEEDINGS.

I.

ANNUAL ADDRESS,

By PROF. J. L. CABELL, M. D.,
President.

Gentlemen of the Public Health Association, — In executing the duty of briefly noticing the most conspicuous events relating to the interests of the public health which have occurred since our last annual meeting, it is a source of great gratification that I am permitted to congratulate you on the partial realization of the hopes which have inspired and directed our common efforts since the original organization of this body, and especially since the outbreak of the great American epidemic of 1878. I allude, of course, to the auspicious fact that the National Legislature has at length distinctly recognized the necessity of an adequate provision by law for the care of the public health by the establishment of a National Board of Health, provisional at first, but doubtless soon to be made permanent in a perfected organization.

The deeply tragical events of the previous summer had caused an unusual degree of interest to be manifested by the public at large with regard to the proceedings of the Association at its last annual meeting in Richmond. While it is undeniable that we are mainly indebted to the profound impression produced by these events for the readiness with which the two houses of Congress entered upon measures of sanitary legislation, we may yet, without unbecoming self-laudation, claim for this body the credit of having the sagacity to perceive and the energy to utilize the opportunity thus offered for initiating measures which looked to the probable consummation of its hopes in the inauguration of a system of sanitary legislation, which should thereafter become a permanent feature in the civil administration of government, State and national, aiming thereby to make the epidemic of 1878 achieve for the cause of state medicine in the United States what the cholera epidemic in England had done for that country not many years ago.

It will be remembered by those who attended the Richmond meeting of the Association, that all its proceedings indicated a prevailing impression that the time had arrived for immediate and earnest efforts to secure effective sanitary legislation, both by separate States and by the General Government. Numerous resolutions foreshadowing some such result as an event near at hand, were referred to your Executive Committee, who were to have the aid and counsel of a special advisory committee, composed of one member from each State represented in the Association, and a representative from each of the three branches of the National Medical Service, together with the Commissioner of Education. This committee was charged with the duty of advising with the Executive Committee, with regard to such matters of legislation coming before Congress at the then ensuing session, as might relate to subjects of public health, and the Executive Committee was expressly instructed to exert its influence to secure such legislation as would best protect the public health of the whole country. The two committees met in conference January 2 and 3, and, after careful deliberation, certain conclusions were adopted by the unanimous vote of all present, and they were subsequently indorsed by all or nearly all the absent members of both committees. These conclusions were embodied in a printed "memorandum," of which a copy was sent to every member of both houses of Congress, and to every member of the Association.

Just here let me say that I should do violence to my sense of justice if I did not bear public and emphatic testimony to the important services rendered in this connection by the first vice-president of the Association, Dr. J. S. Billings, to whom mainly is due the credit of planning and formulating the several propositions, and subsequently of bearing the largest share of the burden of the practical work needed to carry them into effect. No language of mine could exaggerate my sense of the value of those services, or of the obligations he has laid upon all who desire to advance state medicine in our country.

The memorandum in question did not meet with unqualified approval outside of the committee by whom it was finally adopted. Elsewhere it was objected by some that it was unwise and impolitic to inform Congress that there was danger of premature and unsatisfactory legislation from want of proper and sufficient information, and equally so to ask Congress to delegate to an extra-governmental body, such as the Academy of Science, the power of designating the members of a Provisional National Health Commission. It should be remembered, however, that existing facts fully warranted the apprehension of danger as to rash legislation, and that in the sequel it appeared that the frank avowal of these fears by the authorized representatives of this Association had a manifest effect upon the members of the National Legislature. It was owing to this position of the committee, as I happen to know, that several members of Congress were induced to withhold their consent to ill-advised measures, by which it was proposed to confide the whole subject of quarantine, along with other autocratic powers, to the sole discretion of a single Director-general of Health.

The other objection proved to have more force ; not, indeed, as directed against the intrinsic merits of the proposition to withdraw the power of designating the membership of the proposed commission from politicians, whether in the legislative or executive departments of the Government, for such a proposition needs only to be announced to command general approval, but it was decided by competent authority that Congress could not legitimately delegate to any body of men outside of the Government the right to appoint the members of a commission to be created by an act of the national legislature. There were perhaps some other objections of minor significance, which were refuted by the progress of events, and need not now be repeated.

Besides the recommendation for the appointment of a provisional Sanitary Commission which should be charged with the duty of reporting to the next Congress a plan for a permanent health association, and one for a national quarantine system, and also with the duty of making investigations into the causes and means of prevention of yellow fever or other epidemic diseases which might be referred to it by Congress, selecting experts for that purpose as far as might be necessary, the memorandum insisted upon the necessity of a proper organization of State and local boards of health, and alluded to a possible mode of paying a part of their expenses, which, as the germ of a principle subsequently attempted to be incorporated in the act of Congress establishing the National Board of Health, deserves to be specially noted. Pardon me for citing the section of the memorandum to which I allude : —

"XI. We are entirely convinced that the future of public hygiene in this country depends mainly upon the proper organization of State and local boards of health, and upon such recognition of their importance and utility by the people and their legislators, that the necessary means and powers shall be granted to them to enable them properly to perform their duties. We believe that the General Government can do much to stimulate and encourage the formation of such boards, and that an important part of the duty of the Provisional National Health Commission, which we have recommended, will be to point out what can best be done to forward this object.

"Such boards can do good work, not only for their own locality, but for the nation, *and if the nation will pay for this work* it will be most cheerfully done, especially if a proper central health organization be arrived at, with which they can coöperate, as we hope and believe will be the case if the plan we have suggested be carried out."

In strict conformity with the views enunciated in the "Memorandum," a bill was drafted and submitted to Senator Withers and the Hon. John Goode, of Virginia, who were expected to introduce it in their respective branches of Congress. After a careful examination of the bill as proposed, these gentlemen expressed grave doubts as to the power of Congress to delegate to the Academy of Science the authority to select the members of the proposed commission, and it was ultimately decided to dispense with the intermediate agency of a provisional sanitary commission, and to assign directly to the National Academy itself the duty of reporting to Congress at its next session a plan for a national health organization. To this end a very short bill was introduced by Senator Withers, and appropriately referred. This encountered some unfavorable criticism of a portion of the medical press of the country, on the alleged ground that it involved an abdication of the rights of sanitarians, and remitted to a body of naturalists the decision of grave and important questions relating to the public health of the nation. A simple statement of the fact that sanitary science was represented in the Academy by some of its ablest votaries in this country, and that when, in accordance with the requirements of its charter, the Academy is called upon by any department of Government "to investigate, examine, experiment, and report upon any subject of science or art," it is usual to refer the particular subject to a committee composed of experts in that subject, sufficed to disarm the criticisms of all show of significance, and to produce silent if not cheerful acquiescence. The bill in question was, however, strangled in the committee, who reported a quarantine bill of Senator Harris, which passed the Senate, but failed in the lower House during the last days of the session, when the McGowan bill was introduced and rapidly passed both houses, and, being approved by the President, became the constituting act, under which the present National Board of Health was organized. As it passed the House of Representatives, where it originated, it contained the following important clause in section 2: —

"It shall also aid in the work of State Boards of Health, and of State and municipal authorities, by such means and to such an extent as may seem to it necessary and desirable. And for this purpose it is authorized to pay a certain portion of the expenses of such State Boards of Health or quarantine authorities, at its discretion. *Provided*, that the amount so paid shall in no case exceed one half the total expenses for any such Board or quarantine authority. *And provided further*, that such reports and information as may be required by the National Board of Health shall be furnished by the State Boards and quarantine authorities so aided."

To carry out the purpose expressed in the foregoing clause, provision was made in section 4, by appropriating the sum of $500,000.

This idea of assisting the State Boards of Health by paying one half of their expenses (on certain conditions) was derived from the practice of the Local Government Board in England, which, as the central health authority, is charged, among other things, with the distribution of funds appropriated by Parliament for sanitary uses, and which, in the execution of this duty, assumes with reference to certain outlays for sanitation a moiety of the expenses incurred by the local authorities. The operation of this principle in that country has been attended with the happiest results, and the fact is worthy of our study and imitation. Allusion will again be made to it.

The clause in question having been omitted by the copying clerk, through an error for which he was not alone to blame, the act, as approved, contained only an appropriation of $50,000 to pay the salaries and expenses of the Board, who were directed to obtain information upon all matters affecting the public health, to advise the several departments of Government, the Executives of the several States, and the Commissioners of the District of Columbia, on all questions submitted to them, or whenever, in the opinion of the Board, such advice may tend to the preservation and improvement of the public health; and, also, with the assistance of the National Academy, to report to Congress at its next session a full statement of its transactions, together with a plan for a national health organization, after consultation with the leading sanitary organizations and sanitarians of the country.

In compliance with the direction to obtain information upon all matters affecting the public health, the Board has set on foot a number of investigations by skilled experts, of which a summary enumeration will be found in its quarterly report to the Secretary of the Treasury, as published in the

Bulletin, No. 17. I may be allowed to refer more particularly to one or two of these investigations.

And, first, as to the work of the Havana Commission, composed of Dr. S. E. Chaillé and Col. L. S. Hardee, C. E., of New Orleans; Dr. John Guiteras, of Philadelphia, and Surgeon G. M. Sternberg, United States army, who were instructed—

1. To ascertain the actual sanitary condition of the principal ports in Cuba, from which shipments are made to the United States; to determine how their sanitary condition can be made satisfactory, and especially to determine what can be done to prevent the infection of the shipping at these ports by yellow fever.

2. To obtain information with regard to the condition which may be supposed to determine the endemicity of yellow fever in the ports of Cuba.

3. Another desideratum was to increase existing knowledge as to the pathology of yellow fever.

4. The Commission was further instructed to endeavor to find some means of recognizing the presence of the immediate cause of yellow fever other than the production of the disease in the human subject.

The first two divisions of the general subject were undertaken by a committee consisting of Dr. Chaillé and Colonel Hardee, who have collected a vast amount of valuable information from not less than forty-five places in the island, including the fifteen ports of entry, several of which, in addition to the principal ports of Havana and Matanzas, were visited in person by Dr. Chaillé. Most of this information, though highly important, is more of a commercial than a scientific nature. It was ascertained that the disease has prevailed in Havana every year since 1761, and it is alleged that it was imported from Vera Cruz. This endemic prevalence was ascertained to be more marked in towns which have the largest unacclimated population, where the houses are crowded together, densely inhabited, and badly ventilated, and where much filth exists. The actual sanitary condition of these towns was correspondently bad, as exhibited by the high death rate of from 40 to 50 per 1,000 of the population.

In relation to the shipping, Dr. Chaillé satisfied himself that the poison did not originate in them, but was brought from the shore, and avers that the facts to be given in his report will bear him out in this assertion. He cites, among other evidence, the fact that while yellow fever constantly prevails in the port of Cardenas, the shipping is almost entirely exempt from infection; which he ascribes, in part, to the large size of the harbor and its excellent ventilation, and in part to the fact that the anchorage is at some distance from the shore.

Finding that the provisions of the Act of June 2, 1879, for securing the best sanitary condition of vessels in the ports of Cuba, destined for the United States, could not be effectually enforced without the consent and aid of Cuban authorities, and that this has been withheld, he recommends an attempt to attain our object by means of an international code, to be agreed upon by all the maritime powers interested in this matter. Dr. Chaillé's preliminary report, now ready for transmission to Congress, will be about forty printed octavo pages, and his final report, which will be very much more elaborate, will require several months for its preparation.

The pathological investigations were confided to Dr. George M. Sternberg, of the army, and Dr. John Guiteras, of Philadelphia. Numerous autopsies and dissections were made, and tissues, obtained directly after death, were at once put up in suitable preservative liquids and brought to the United States for thorough and careful study. This investigation will be carried on under the personal supervision of Dr. J. J. Woodward, the eminent pathologist of the Army Medical Museum, who has been requested to present a special report upon the subject.

The pathological histology of the blood of yellow fever patients was the subject of very earnest and patient study by Dr. Sternberg, with the result of discovering a constant lesion of the white corpuscles, which, however, with a proper reserve, he hesitates to announce as peculiar to yellow fever until he shall have had an opportunity of extending his observations to other fevers and allied affections. He is now, and will for some time be, engaged in making parallel observations on the blood of persons suffering from various diseases — especially febrile diseases. The lesion in question is a fatty degeneration of the white corpuscles not heretofore described, and is well exhibited in his numerous and beautifully executed micro-photographs of the blood of yellow fever patients. His careful observations with the best instruments determined no other positive fact which was new to science; but they have an important negative value in disproving the assertions of other observers. Dr. Sternberg has also photographed certain crystalline bodies in the air, taken from various localities in Havana, notably in the wards of the military hospitals, under and above the beds of yellow fever patients, which he is now investigating in the same manner by comparison with the forms found in the air of hospitals and other places in various parts of the United States. If it be found that these crystals have not heretofore been described, and that they are peculiar to the air of places infected with yellow fever, the observation will be an interesting acquisition to science, and may possibly lead to valuable results.

In directing the Commission to endeavor to find some means of recognizing the presence of the immediate cause of yellow fever, other than the production of the disease in the human subject, the Board was well aware that the problem of finding such a physiological test of the yellow fever poison, with a view to its isolation and identification in any case, and to its propagation by culture experiments, if it should prove to be a *contagium vivum*, might, and probably would, be found to be insoluble. Nevertheless, it was considered proper to authorize and instruct the Commission to institute such experiments as have resulted in valuable discoveries when applied to some other infectious diseases — notably the splenic fever, shown by Koch to be caused by *bacillus anthracis* — a fact which has received a striking confirmation in the history of the Loodiana fever, which, as stated by Sir Joseph Hooker, President of the Royal Society, has been so fatal to horses in the East. He states that dried blood of horses that had died of the disease in India has been recently sent to the Brown Institute, and from seeds therein contained a crop of *bacillus anthracis* has been grown which justified its distant pathological origin by reproducing the disease in other animals. Other experiments have shown that the grains which are so largely used as food for cattle, afford a soil which is peculiarly favorable for the development and growth of the spore filaments of *bacillus*, and that by such grains, when infected, the *anthrax* fever can be produced at will under conditions so simple that they must often arise accidentally. So, too, in the report of the medical officer of the Local Government Board for 1877, we have a detailed account of Dr. Klein's positive demonstration of a special *contagium vivum* in the case of the infectious *pneumoenteritis* of the pig (or pig typhoid), the disease being produced in repeated experiments by inoculating healthy animals (pigs and mice) with microphytes which had been raised in culture experiments through seven or eight generations.

Thus far the results obtained by the Havana Commission in investigations of this kind have been purely negative. Every attempt to communicate the disease to animals, more than a dozen species being tried, completely failed.

Among the results of the work of this Commission, which give promise of future benefits, may be mentioned the manifest and freely-acknowledged influence which it exercised upon the government and medical profession of Cuba, in arousing them to a lively interest in the etiology and prevention of yellow fever. The Cuban authorities were at once prompted to appoint an auxiliary commission to aid ours, and have since made this auxiliary commission a permanent one.

The second step taken by the Board with reference to its required duty to obtain information upon all matters affecting the public health, was to instruct the Standing Committee on State and Municipal Sanitary Legislation to collect and collate the sanitary laws of the several States, including not only the statutes, but the decisions of the courts on questions involving public hygiene. This important work has been conducted by a competent member of the bar in Boston, R. C. Lincoln, Esq., under the direction of Dr. Bowditch, chairman of the Standing Committee.

It is believed that the book will contain every decision and case in the State and United States reports which considers in any degree either a general or a special sanitary law or act, or any subject or matter of health not made a matter of specific legislation, and the aim will be to make the abstracts so full, by embodying not only the legal point, but the essential part of the facts of the case, and the act or by-law involved therein, as to make it unnecessary to go to the original reports. There will be a full index at the end of the book, so that by means of that index and a methodical arrangement of the text any sanitary subject which has ever been before the courts can very readily be found. No comment of mine can be needed to indicate the great value of such a work.

Disinfection, or the destruction of the poisons of infectious or contagious disease, must, by the very terms of the definition, provided such definition be warranted by facts, be an efficient agency in the prevention of the spread of such diseases. It is, therefore, of the utmost practical importance to ascertain what agents, with such pretensions, are really effective, and which of the various proprietary combinations may be relied on for efficiency and reasonable economy. To this end, the National Board, at an early period, took measures to have such inquiries carried out by the most competent experts in the country. As stated in No. 17 of the "Bulletin," there was work in this connection for three commissions of experts. The first was directed to inquire and report as to the intimate nature of the process of disinfection under varying circumstances; the second was to prepare a report upon the best disinfectants for popular use, with instructions how to use them, given in such a popular form as to be readily intelligible to common people. This report was printed by the Board as Circular No. 8, and was widely distributed, especially in the cities and towns of regions likely to be invaded by the yellow fever. The third was to determine the value of such proprietary disinfectants as were submitted to the Board.

This latter investigation was kindly undertaken at the Laboratory of the School of Mines, Columbia College, N. Y., by Prof. C. F. Chandler, Ph. D., and Elwyn Waller, Ph. D. The first installment of their reports is published in the number of the "Bulletin" just mentioned (No. 17), and effectually disposes of the pretensions of some of these proprietary disinfectants.

The investigation first specified, that, namely, which relates to the effects of disinfecting agents upon the causes of the infectious diseases, or the intimate nature of the process of disinfection, is one of incalculable importance, both in its scientific and its practical aspects, and has been undertaken, under the general direction of Dr. C. F. Folsom, by Dr. W. S. Bigelow, of Boston, assisted by Dr. H. P. Bowditch, Professor of Physiology, and Dr. Wood, Professor of Chemistry, of Harvard University.

In this connection I may be permitted to allude to an episode in the official history of the Board, which occurred during the earliest weeks of its existence, and which has been misunderstood by some, misrepresented by others, and, by certain interested parties, made the occasion of an attempt to cast obloquy on the Board. I refer to the action taken by the Board in the matter of Professor Gamgee's plan of a so-called refrigerating ship "to disinfect vessels and cargoes from ports suspected of infection with yellow fever or other contagious diseases."

The idea of resorting to cold artificially produced, as a means of destroying the germ of yellow fever, is not an altogether novel proposition. The fact that the first white frost puts an end to yellow fever epidemics had several years ago led to the suggestion of disinfecting limited places and articles contained in them by artificial cold.

Dr. J. C. Faget, of New Orleans, in 1864, premising his suggestion with the remark that "*Art* never can do better than to imitate nature," announced that the "lowering of the temperatures in the holds of ships, which have to be purified, should be tried."

In the report of the Board of Experts it is stated that "the yellow fever poison is not able to withstand the influence of frost, and when exposed to a freezing temperature it is rendered innocuous, and is probably destroyed. . . . . If the apparatus and experiments now projected for the utilization of extreme cold to this purpose should be found to be of practical application to the disinfection of the holds and other parts of vessels, their success would prove to be a sanitary acquisition of inestimable value."

A short time before the organization of the National Board of Health a bill had been introduced into Congress for the construction of a refrigerating ship, authorizing the Secretary of the Treasury to contract with John Gamgee for the same. When this measure was undergoing consideration by the Senate Committee on Epidemic Diseases, Senator Harris, of Tennessee, as chairman of the committee, addressed a communication to the three medical officers who had been detailed to represent their respective services in the newly-established, but not yet organized, National Board of Health, and requested an expression of their opinion as to the merits of Professor Gamgee's proposed refrigerating steam-vessel as a means of disinfecting vessels and their cargoes. In their reply, dated March 27, 1879, they make the following, among other statements : —

"5. Whether the production of a temperature, even as low as zero, in a ship for a comparatively short period of time, *id est*, for a few hours, will destroy or render permanently harmless the yellow fever poison, we do not know, there being no satisfactory evidence in existence upon this point. But, from what is known as to the effects of temperature upon this disease, we are of opinion that the experiment is worth trying.

"6. It will be seen that we consider the project as an experiment ; it is, in fact, impossible to view it otherwise. But even in the case of failure, the results can hardly fail to be of considerable scientific value, while in case of success the cost would be a comparative trifle."

Such was the posture of the question when the Board of Health was organized and went into operation, in the first week of April, and at an early stage of its proceedings substantially indorsed the conclusions announced in the communication of the three medical officers to the chairman of the Senate Committee, with this additional argument in favor of the expediency of making the experiment, — that whatever might be the issue of that experiment, as to the complete destruction of the poison, it would almost certainly render it safe for even unacclimated persons to assist in discharging the cargo of an infected ship. About this time, too, the draft of the original bill was so changed as to omit Professor Gamgee's name and to require the Secretary of the Treasury to contract for the purchase or construction of such steam-vessel and refrigerating machinery, or to arrange with the Navy Department for the use of such vessel as may be recommended by the National Board of Health to disinfect vessels and cargoes from ports suspected of infection with yellow fever or other contagious diseases, the construction of the same, if such construction shall be recommended by said Board of Health, to be under the inspection of an officer of steam engineering of the navy, who may, at the request of the Secretary of the Treasury, be detailed by the Secretary of the Navy for that purpose, etc." This bill passed both Houses of Congress, and was approved April 18, 1879. Shortly thereafter several parties submitted plans and specifications for the work in question, and the Board of Health requested the Secretary of the Navy to convene a board of experts skilled in naval engineering and ship construction to examine and report upon these competing plans. This was courteously granted, and a Board consisting of Mr. David Smith, Chief Engineer of the Navy, two passed assistant engineers, and a naval constructor, was appointed May 2, and at once proceeded to the discharge of its duties. After six weeks of close and searching scrutiny, this Board made an elaborate report of sixty-two foolscap pages, in which the scientific principles involved in the construction and working of both vessels and machinery were exhaustively discussed.

After describing each plan, and noticing the bearing of the principles of thermo-dynamics and of ship construction in their application to each, the report stated that, "after a close study of the problem to be solved, and a careful examination of all the plans presented, the board find that the plans submitted by John Gamgee show the most thorough and intelligent consideration of the subject, and promise to do the required work most efficiently and economically."

It is true that a few changes relating to matters of detail were recommended, but the emphatic indorsement of the general plan and the express and positive rejection of every competing plan made it the duty of the Board to recommend Professor Gamgee's scheme to the Secretary of the Treasury. On application to Professor Gamgee for his papers, it was found that he was unwilling to submit his plan and disclose his discoveries and inventions to rival inventors, who might, if the work was offered to the lowest bidder for execution, undertake the job, and, either from incompetence or other causes, jeopard the success of the scheme. He contended that the vessel and the refrigerating machinery should be constructed together; that they involved an almost continuous succession of scientific inventions which were his own property, and which were, to some extent, to be perfected as the work advanced, and which could not be provided for in a specific contract, such as is usually entered into by machinists and ship-builders.

The Board of Health being, therefore, of opinion that the success of the experiment would largely depend upon its execution being confided in all its parts to those who had conceived and designed it, allowing a reasonable latitude in matters of detail for such modifications as might be suggested in the course of the work, deemed it expedient to advise the Secretary of the Treasury to make the contract with the inventor of the plan which had been so strongly recommended by the board of naval experts. But the Secretary, in a personal interview with the Executive Committee, announced as his construction of his duty that he was not authorized to make a contract otherwise than is provided for in the Revised Statutes, namely, by advertising the plans and specifications, and offering the work to the lowest responsible bidder. Professor Gamgee having positively refused to permit his plans to be thus used, and the Naval Board having discredited every other plan, the National Board of Health considered that it had discharged its duty and had nothing further to do in the premises, except in compliance with a special order of Congress, communicated through the Secretary of the Treasury, to report to that body all its proceedings so far as they related to this matter.

The resentful spirit manifested by rival parties, whose plans had been unfavorably criticised by the Board of Experts, might have been expected, and very naturally sought ways of expression ; but there was less excuse for some others who had at first approved the proposed experiment, and subsequently, under the pressure of an apparent adverse popular sentiment, based upon the supposed significance of the case of the United States ship *Plymouth*, indulged in unfriendly criticisms of the actions of the Board. I do not know what may be the present views of the members of the Board ; for the subject has not been officially before the Board since the date of the events I have briefly narrated ; but for myself, I am free to say that in my judgment the affair of the *Plymouth*, as reported by a naval commission, has not decided the question under consideration, and that having placed on record my vote, as one of the Board, in favor of the expediency of making the experiment by means of Professor Gamgee's plan, I am of the same opinion still, and, therefore, regret that untoward circumstances have prevented the application of the experimental test. I will only add in further vindication of the propriety of the action taken by the Board, that refrigeration was only a part, and but a very small part, of the appliances to be put into requisition by Professor Gamgee's plan. In a communication which he addressed to the Board, April 22, nearly two months before the latter was called upon for final decision on receiving the reports of the naval experts, Professor Gamgee had stated that, in addition to refrigeration, he proposed to provide the following means : —

"*a.* Deliquescent chlorides, and especially the chloride of magnesium, to remove from the air all molecular matter and moisture. The air will be then rendered *absolutely* and *optically* pure, etc.

"*b.* A close chamber, to be raised to any desired temperature for disinfecting purposes, to purify clothing, etc.

"*c.* An entirely new system of temporarily substituting for the air of a ship antiseptic gases, measured, weighed and introduced as liquids in the most inaccessible parts, and which, passing spontaneously from the state of liquid to that of gas, will permeate everywhere, and, if necessary, be made to penetrate under pressure.

"*d.* Electrical apparatus for lighting and safely inspecting every part of an infected vessel. . . . .

"*e.* Medicated or disinfecting baths, or chamber in which convalescent people or persons exposed to contagion may be purified before landing.

"*g.* Apparatus for superheating and with an entirely novel method of so regulating superheated steam, if ever used in disinfecting a ship which has been stripped for the purpose, as to maintain safe temperatures and prevent firing or other inconvenience."

It was such a combination of instrumentalities, and not simply a refrigerating machine, that the National Board of Health recommended, and that, too, avowedly, as an experiment, in respect of this alleged capacity of being brought to bear upon vessels lying in quarantine. There could scarcely be a question as to the value of some or all of these agencies, if they could be applied efficiently and at a reasonable cost, and this, already rendered probable by the recorded opinions of competent experts, was to be tested by the proposed experiment.

I refer you to the "Bulletin" for a summary statement of the other subjects of investigation which have engaged the attention of the Board while acting under the provisions of the constituting act.

Before the President of the United States had appointed the members of the Board of Health, as established by that act, the two Houses of Congress had been convened in extra session, and a bill (S. 180) for a national quarantine had been introduced and appropriately referred. When, a few weeks later, the Board was duly organized, the bill in question was referred to it for criticism and suggestions.

In the earlier communications with the Chairman of the Senate Committee, the Board was disposed to adhere to the views recommended by your committees, and suggested that there should be no further legislation at the then existing extra session of Congress than to appropriate funds to enable the Board to aid State and local boards of health, as provided for in the McGowan bill before it had been shorn of an important clause which had actually passed the House of Representatives, but owing to a clerical error did not go to the Senate. To meet the supposed urgent wants of the approaching season, and to satisfy Southern members of Congress whose disastrous experience of previous summers had led them to cling to the idea of a rigid quarantine as the only hope of averting a renewed importation of the yellow fever, it was proposed not only as in the original clause to specify quarantine authorities, as joint recipients of the bounty of the General Government to be distributed through the agency of the National Board, but also to omit the provision which imposed a maximum limitation of this aid to one half the total expenses of any such board or quarantine authority. The clause would then have read thus: —

"To aid State and local boards of health and quarantine authorities, to be expended under the discretion of the National Board of Health, the sum of five hundred thousand dollars is hereby appropriated, *provided* that such reports and information as may be required by the National Board of Health shall be furnished by the State and local boards and quarantine authorities thus aided."

It was represented, however, that the proposed omission of the limiting clause was only recommended for the first year, and that thereafter it would be desirable to limit the amount of national aid to a definite proportion of the expenses of the local boards, and it was contended that this conditional aid would be an effective stimulus to State and municipal organizations, which, under our federative system of government, alone have authority to execute and enforce sanitary laws.

But these suggestions of the National Board failed to command the favor and approval of the Senate Committee. It was objected by the distinguished Senator from this State,[1] who was at the head of that Committee, that Congress had no power under the Constitution to appropriate one dollar to purely local sanitary measures. This feature, a favorite and cherished one with the Board, as it had been with your two committees, had therefore to be abandoned, and was actually abandoned with great reluctance and regret. And yet the Board, thus restrained by law, has encountered censure and obloquy, because, in obedience to law, it felt itself constrained to reject applications for money to be expended in local sanitation.

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[1] Tennessee.

The Senate Committee having thus positively rejected the leading proposition of the Board, the chairman announced, as the purpose of his committee, the establishment of a national system of quarantine within the scope of Federal power. Within that scope the National Board of Health would, in the event of the passage of the bill then in the hands of the committee, be the supreme power and authority. It would be required to establish an outer line of works beyond the jurisdiction of the States, sitting in judgment upon every vessel sailing on the high seas to American ports, before it reaches the jurisdiction of any State. It would have authority to stop an infected ship at this outer line, and to forbid it going further, and this without trenching on any of the reserved rights of the States. If it saw no sufficient reason to stop any vessel, and should therefore allow it to proceed towards its destination, this would in no degree remove or lessen the right of the State or municipal authorities to exercise absolute power of inspection, detention, and the enforcement of whatever regulations they might see proper to apply. Thus the unqualified right of every State to adopt for its own security whatever quarantine or sanitary laws it might deem judicious and proper, and to enforce them within its own jurisdiction, was expressly and emphatically conceded. A vessel having satisfied the Federal authority would still have to pass the ordeal of State quarantine if the State should choose to establish its separate quarantine. But it was contended that the practical result would be found to be that every State in the Union, except, perhaps, two or three which have established, to their own satisfaction, very elaborate quarantine systems, would soon abandon their quarantine establishments, and leave the whole matter in the hands of the National Board of Health.

When the bill, on being reported from the committee, came up for discussion in the Senate it encountered strong and persistent opposition in quarters where such opposition was least expected, on the grounds alleged, those namely of interference with the reserved rights of the States. After an earnest debate the bill was recommitted by a vote which made it apparent that it could not pass the Senate without radical changes.

It was accordingly modified in many important particulars, especially in striking out two entire sections and parts of others and substituting Section 3 of the act, as subsequently approved June 2, under which the Board has conducted all its operations in the fight against the spread of yellow fever during the summer just passed. The substituted section authorized the Board to coöperate with, and, so far as it lawfully may, to aid the State and municipal boards of health in the execution and enforcement of the rules and regulations of such boards to prevent the introduction of contagious or infectious diseases into the United States from foreign countries and from one State to another.

Curiously enough, while the National Board had no little difficulty in ascertaining the extent of its powers under this section, the public generally, including the health authorities of many of the Southern cities and towns, interpreting the law, some by a foregone conclusion as to the supreme authority of the General Government, which they assumed had been delegated to the Board *quo ad* all questions affecting the public health, others, by their hopes of obtaining relief from the public treasury, seemed to have taken for granted that the National Board of Health, as representing the national authority, could exercise powers for the relief of State and municipal boards of health, limited only by the amount of funds placed at its control. It was not until after much correspondence and frequent republications of Circular No. 7, that parties interested could be brought to appreciate or to acquiesce in the rules which governed the action of the National Board in aiding State and local boards in conformity with the provisions of the law as construed by the chief of the Treasury Department, whose approval was a condition prerequisite to any and every disbursement of the funds. Thus it had to be explained over and over again that funds were not furnished by the Treasury to State or local boards, but were placed in the hands of a bonded officer, the disbursing clerk of the Board, by whom bills properly certified and approved by the auditing clerk would be paid by check; that all bills should be in accordance with the estimates previously approved by the Secretary of the Treasury; should be made in duplicate on forms furnished by the National Board and be certified as to their correctness by some authorized officer of the State Board of Health, or the Governor of the State, and should be approved by some member or special sanitary inspector of the National Board duly authorized to act, and that all bills for services rendered, or for articles furnished, local or State boards must be sworn to by the person rendering the service, or furnishing the article. The enforcement of these rules has brought the Board into disfavor with a number of parties, who strongly object to what they consider an unnecessary adherence to an absurd and very annoying red-tape system.

The Board not being authorized to establish quarantine, or to enforce rules and regulations relating to quarantine, decided to make it a condition of extending aid and coöperation to State and local boards of health, that these should adopt such rules and regulations as might be approved by it. In pursuance of this policy, it prepared a scheme of rules to be recommended to the local and State boards for their adoption. By such adoption these boards would make them their own rules and regulations, and then the National Board would be authorized to aid in their execution and enforcement, the objects being to substitute a rational system of observation and inspection which would but slightly interfere with travel or traffic, and yet protect the public health, for the shot-gun quarantine, or absolute non-intercourse, the effects of which are often far worse than the evils it is intended to prevent.

In the preparation of the several sets of rules and regulations recommended to be adopted by quarantine authorities at maritime ports, and by State and municipal boards of health, for securing the best sanitary condition of steamboats and other vessels, and that of railroads, as well as those to be enforced in a place free from infection, but having communication with a place dangerously infected with yellow fever, and where the fever is reported or suspected to exist in any town or place in the United States, the National Board derived valuable assistance from the Sanitary Council of the Mississippi Valley in a conference held at Atlanta during the session of the American Medical Association, early in May. It was also indebted to that Council for the suggestion of a practical measure of great importance, the establishment of quarantine stations of observation at several points on the Mississippi River. This suggestion was strongly indorsed by the representatives of the leading steamboat lines on that river at a conference with a committee of the National Board of Health, held by invitation of the Board at Memphis, July 2. At this conference assurance was given of the cordial coöperation of the railroad and steamboat interests in all the measures recommended by the Board, with a view to prevent the spread of the yellow fever and other contagious or infectious diseases. All that was asked was that all rules and regulations prescribed by the Board should be made uniform at all places. In accordance with this suggestion the Board established two floating quarantine stations of observation on the Mississippi River in the vicinity of Cairo and Vicksburg, omitting the station which had been suggested for Memphis, in view of the actually infected condition of that city. In the establishment of these special stations, designed not for the protection of any one State, but of the entire Valley of the Mississippi, it was considered advisable, and even necessary, to establish them with the funds placed under the control of the Board, and to operate them through the agency of its own employees. This apparent departure from the general policy of operating exclusively through the agency of State and municipal boards of health in all practical measures of quarantine seemed justifiable, both on the ground of legality and of expediency, in view of the fact that it met with the hearty concurrence of the States within whose territorial limits the stations were proposed to be established, and was recognized by them as an important mode of aiding such States in the execution and enforcement of rules and regulations, which they had made their own by adopting them, to prevent the spread of yellow fever from one State to another.

The results realized from the workings of this system have been in the highest degree encouraging, as appears from an interesting letter from Dr. J. H. Rauch, dated at Cairo, September 22, and published *in extenso* in the National Board of Health "Bulletin," No. 14. Referring to the then recent outbreak of yellow fever in Concordia, Miss., he states that the value of the inspection system was strikingly demonstrated, inasmuch as, notwithstanding the demoralization which ensued upon the announcement of this local outbreak, there had been no interruption to river travel, and, with the exception of a few points below, there had been no resort to the former policy of non-intercourse. He further stated that the interest of the steamboat men continued unabated, and that some of the bitterest opponents at the commencement had become the warmest advocates of this system, and desired that the station should be permanent. It will be noted, however, that he incidentally alludes to a few exceptional "points below," in which the useless and barbarous policy of non-intercourse had not been laid aside. In this connection Dr. F. W. Reilly, Sanitary Inspector of the Cairo station, reported about the same time that complaints were made by captains of boats, that notwithstanding the numerous inspections and multiplied bills of health with which they were furnished, they were, nevertheless, refused permission to land at several points on the river. This, he reported, was beginning to produce a feeling of impatience and a disposition to evade inspection when possible.

These facts are cited somewhat in detail, for the reason that in the discussion which is to ensue, the question as to the expediency of maintaining permanent stations of observation on the Mississippi River is one of the prominent topics, and you will be invited to express your opinion as to the expediency of incorporating this feature in a plan for a national quarantine, and as to the relations which such a system should bear to State and local quarantines. The conditions under which the representatives of the steamboat lines agreed to be governed by the rules and regulations recommended by the National Board, namely, that they should be enforced with uniformity, the facts stated by Dr. Reilly as to the disappointment of their expectations in this regard, with the resulting inconvenience and annoyance experienced by them, and the obstructive course pursued by some of the local authorities, indicate the principal difficulties to be met, and, if possible, overcome, in order to a perfectly satisfactory working of any system of inland quarantine which is attempted to be enforced with uniformity under the auspices of a central board of health.

A similar difficulty would be presented if the Board should attempt to establish maritime quarantine stations of inspection, as at Delaware Breakwater, in Hampton Roads, and at certain points on the Gulf coast, with the view of protecting several States and municipalities against the introduction of contagious and infectious diseases by means of vessels sailing from either foreign or American ports. If the health authorities of the States and municipalities for whose protection they would be established should ignore them and subject vessels already furnished with clean bills at their stations to further detention and expense, the measure will cause such dissatisfaction and complaint as to render it a question of doubt whether they should be established. And yet the subject is one of very great importance. It has been affirmed by high authority that the lack of power on the part of the General Government to control the maritime quarantine of the American ports precludes the possibility of our country becoming a party in any international congress which might be convened to consider this subject and to recommend international treaties with reference to mutual protection against the interchange of infectious diseases.

This subject then, involves questions of a delicate and difficult nature, which will require the most careful consideration of both statesmen and sanitarians. I confess that I can see no other way of removing the difficulties than that of obtaining the consent of the States directly concerned to a uniform plan of national quarantine, which, in the case of inland quarantine, will require the consenting States to exercise their undoubted authority to prescribe the rules which should govern the action of municipalities within those States as to all quarantine measures. In respect of all measures of local sanitation, I would leave the municipal government to the freest exercise of the self-governing principle.

The only independent authority in respect of enforcing quarantine regulations conferred upon the National Board has reference to such as should be observed by vessels at foreign ports where contagious or infectious diseases exist, when such vessels are about to sail for any port of the United States.

The Board is required by the act prescribing its duties to prepare rules and regulations, which, when approved by the President of the United States, shall be enforced by the consular officers of the United States at foreign ports, submission to them being made the condition of these vessels having free access to our ports, and a failure to observe them being visited by a heavy pecuniary penalty.

This system of inspection of vessels at foreign ports of departure about to sail for ports of this country, was a step in advance of the quarantine system of any other nation, and manifestly a most important one. But to carry out this system in a degree which will insure the greatest efficiency and success, there should be an international code, and this question has recently been discussed at a conference of the Association for the reform and codification of the laws of nations, held in England, when Sir Sherston Baker read a paper on the international rules of quarantine, and suggested that an international bill of health might be granted by the local authorities of the port of departure of every vessel, to be delivered by the Consul representing the port of destination, in such terms as he might think fit, and a similar visé should be required at every port touched at, both from the local authority and from the Consul representing the port of destination. A foul bill of health or a case of disease past or present, on board, or the fact of any port having become infected within a limited time after the departure of the vessel from it, should entitle the local authority of the port of arrival to place the arriving or touching vessel in quarantine, according to a certain scale containing a maximum and minimum period of quarantine.

As to the lessons taught by this summer's experience, I may cite a few propositions as having been established on evidence more or less satisfactory: —

1. That in yellow fever, as in most other infectious diseases, unrestricted family intercourse is one of the most fruitful means of spreading the seeds of the infection, and by this means the disease may be carried from a focus of infection to a previously uninfected locality, where a new focus may be developed.

2. That when prompt notice is given of a case thus imported into a previously uninfected place, proper measures energetically employed will generally suffice to arrest the spread of the disease.

3. That even when the outbreak has assumed the proportions of an epidemic, it is possible by measures rather difficult of execution and requiring not only the strong arm of the law and the use of the public funds, but also the willing consent of the population, to stamp out an existing epidemic by removing all the unacclimated portion of the population and preventing the introduction of any such material from without. Such a measure, practically impossible for large cities or towns except in a very partial degree, may be entirely feasible for villages and towns of moderate population.

4. That a rational system of inspection and disinfection which is not seriously obstructive to commerce and travel, may be as effectual a security against the introduction of yellow fever to our ports of entry and to inland towns as the costly and cruel plan of absolute non-intercourse. In a word, the experience of the National Board of Health during the summer is in accord with that of the quarantine authorities of New York, and justifies the use of the term quarantine to signify "the administration employed to determine the presence or absence of the causes of contagious and infectious diseases in vessels arriving at a port, and the securing, if present, their removal or destruction, and does not imply detention for any specified time, nor for more time than is necessary for the above purpose."

It is not my purpose to anticipate the discussion which will doubtless take place at a later stage of our proceedings, as to the duties and powers which should be assigned to a permanent central board of health, but I may be permitted to express the hope that those who expect to express their opinions will duly consider the special difficulties attaching to the subject by reason of our federative system of government. It is not so much what is desirable as what is practicable — not so much what ought to be done in another and impossible condition of things as what can be done under the actual relations of the States to the General Government, that you are asked to consider. It is generally conceded that the power to make and administer health laws within the States of this Union has not been granted in the Constitution to the General Government. But the question in respect to quarantine as a means of preventing the spread of infectious diseases from one State to another is much too complex and important to be summarily set aside on such a plea. In the opinion of Senator Harris, of this State, who is known to be a determined advocate for a strict construction of the Constitution, the power to regulate commerce not only authorizes Congress to establish maritime quarantine by going outside of the jurisdiction of a State, in order to prevent the introduction of infectious diseases from foreign ports, but also to prevent their transmission from one State into another, though wholly powerless to interfere so long as there is no danger to some neighboring State or States. If, however, a neighboring State is threatened, the power to regulate commerce between the States gives, in his opinion, not only the right to say that the infectious material shall not pass the border into another State, but also the right to enforce the declaration by going, if necessary, to the very centre of the State in order to "throttle the noxious principle at that point." But it must go for the exclusive object of so regulating commerce as to prevent the transportation of disease from one State to another, and whatever is necessary to be done in order to accomplish that object may be legally done under the Constitution. But you must not, under the pretense of accomplishing that object, enter upon general work of sanitation not contemplated by the Constitution of the United States, and which the General Government has no power to do under that Constitution.

In conformity with this interpretation of the Constitution as to the limitations of Federal authority, the National Board of Health has disallowed all applications for aid to carry out measures of local sanitation, except in cases of actually existing outbreaks of yellow fever, when measures of local sanitation became an important or even necessary part of the machinery for destroying the noxious principle, at points, whence otherwise it might have been transmitted to other States.

Assuming this to be a correct construction of the organic law, the question recurs as to the expediency of exercising the power and conferring upon a Central Board of Health, by appropriate legislation, the authority to make and enforce legitimate quarantine regulations. It is to be considered whether, granting the existence of the power, it will be wise to exercise it in opposition to the wishes and opinions of the local authorities.

To a certain extent the sanitary administration in England supplies us with valuable instruction as to the means of obtaining useful results from the coöperation of central and local sanitary boards. In regard to almost all subjects of legislation, the Anglo-Saxon mind is prone to manifest an instinctive jealousy of the central power. It is the testimony of that eminent sanitarian, Dr. W. B. Richardson, that "if the mind of the nation could be fairly tested as to its desires, three out of four would," in his opinion, "prefer the self-governing to the central method in any measure that might be proposed, even though the measure had reference to the dearest of all interests, the first of all interests, the health of the nation in its individual and collective capacity. And whenever," he goes on to say, "we have in a small way gained an experience from a political experiment, in which central authority has been the source of power, the result has perhaps, without an exception, been, at least, but partly successful." Referring then to the zeal and enthusiasm of many who are in the first rank of sanitary advance, and who, like many with us, in their zeal to accomplish all that they are assured preventive medicine can effect, would not waste time in educating the people, but would enforce their measures with the strong arm of the central government, he raises his voice with no uncertain sound against this conception as applicable to his own country. Adverting to his long and varied experience in the trained service of sanitary science, he derives from that experience this definite conclusion, that nothing has so much forwarded the great progress that has been witnessed during the past quarter of a century as the perfect freedom of action that has been permitted, and that nothing more disastrous at this stage of our course, or possibly at any stage, could occur than the interposition of central authority that should attempt to enforce even the wisest of rules on the community by serving it with a subpœna to attend even to its health. "What is demanded now, when the weight of superstition is removed and every man feels that disease is a burden he carries on his own shoulders, is *education*, with time to give it room to turn in and freedom to give it readiness and facility of action."

A similar view was taken by a yet higher authority, Dr. John Simon, the late medical officer of the Privy Council, who held that in the large and permanent interests of sanitary government, a maximum of local self-reliance and a minimum of central intervention are in themselves important aids. He was accordingly of opinion that in general the intervention of central authority should, in the main, be limited to advice and pecuniary aid. But, in order to be placed in a position of advantage for knowing what advice should be given, he attached the greatest importance to systematic inspections by special agents of the Central Board. In this way, better than by mere inquiry and advice by letter, the Board may "competently understand the local conditions or proceedings which it desires to judge, and, secondly, in a degree and with an effort which no letter-writing can attain, it may make to the local authorities such representations and may give them precisely such advice as the particular local circumstances require." Such inspections he considered to be specially called for whenever the Registrar General's returns indicated any unusual prevalence of preventable diseases which had not been prevented, in order that by such skilled inspection, under the Public Health Act, the Board might satisfy itself as to the circumstances and causes of the failure of local sanitation, giving thereupon such skilled advice, or proceeding in certain extreme cases to issue (under the Diseases Prevention Act) such orders and directions as the particular occasion may require.

" Thus by skilled inspections on such a scale as practically to represent a central audit of local death accounts, and an exertion of central influence or authority in favor of more active or better directed local efforts in places where human life has not been sufficiently cared for, the local Board would be in reality, though only in the limited sense which the law prescribes, a Board of sanitary superintendence for England."

In any attempt to employ this machinery as a part of a permanent system of sanitary superintendence for the United States, we shall be placed at a great disadvantage by the lack of as reliable weekly returns of mortality as was offered to the Local Government Board from the office of the Registrar-general in England. But even now most of the municipalities furnish returns weekly to the National Board of Health, and it will be a most important part of the duty of the future Board to devise means for perfecting these returns, and, if possible, to extend the system to the scanty populations of the rural districts.

It has already been stated that the notion of aiding State and local Boards of health by contributing, when necessary, the funds for paying one half of their total expenses, as proposed in the original draft of the constituting act, was derived from the English practice, according to which half the salaries of the employees of the local authorities are paid by the Local Government Board or central authority, out of funds voted by Parliament.

Such a system and its results are full of instruction and encouragement for us. Another extremely important feature of the English practice is particularly worthy of imitation, as having yielded the most beneficent results, and as being clearly within the limits of the constitutional powers of the General Government. I refer to the special scientific investigations conducted by experts appointed for the purpose by the Local Government Board, and published in connection with that remarkable series of reports by Mr. Simon, which, extending from 1869 to 1875, has, as so justly remarked by his successor, Mr. Seaton, had so large an effect in shaping professional and public opinion in sanitary matters, not only in England but in all civilized countries where such matters receive any attention. Such was the importance assigned to these investigations by this eminent physician that, on resigning the office in which he had rendered such valuable services in the cause of preventive medicine, he made an earnest appeal to the Local Government Board to continue them under the administration of his successor, with the statement that he entertained the "strongest conviction that in regard of all antagonism to disease, whether with preventive or curative measures, and whether by official or private hands, medicine's best prospects of increased success are inseparable from such studies of exact science, and that, in proportion as the pathological insight becomes more clear, the growth of practical power will certainly follow."

It is needless to insist upon the truth of his remark, that "where research, if it is to succeed, requires systematic and continuous labor, extending over long periods of time — labor not only inconducive to immediate pecuniary profits, but, perhaps, involving much cost," it can hardly be expected that the study, however great its eventual importance, will be adequately cultivated by private investigators. To foster and encourage such investigations by competent experts appointed by the Board, to organize a system of registration of births and deaths for the whole country, with weekly returns to the central office, and eventually a registration of diseases not only of man but of animals, and by skilled inspections, with an exertion of central influence, by advice and pecuniary aid as far as may be lawfully done, in favor of more active or better directed local efforts in places where human life had not been sufficiently cared for, here is scope enough for the work of a central Board of sanitary superintendence, under the auspices of the General Government.

It is true that the efficiency of such a Board would, under the limitations of authority imposed by the National Constitution, rest upon a less secure basis than that of the Local Government Board of England, where central influence is backed by a reserve of central power, which can be brought into exercise when the exigencies of the occasion require it. Thus the Health Act of 1875 gives to the central Board "power to make, alter, or revoke such regulations as to the Board may seem fit, with a view to the treatment of persons affected with cholera or any other epidemic or endemic or infectious disease, and preventing the spread of cholera and such other diseases," and imposes a penalty not exceeding fifty pounds on any person willfully neglecting or refusing to obey or carry out, or obstructing the execution of any regulation made under this section.

Another section of the same act gives the Local Government Board compulsory power to unite two or more districts when it is satisfied that it would be to the advantage of the districts to combine, and in such cases it may prescribe the mode of appointment of the Medical Officer and Inspector of Nuisances, and the proportions in which the expenses of such appointment, and the salary and charges of such officer, shall be borne by the local authorities who make the appointments.

Thus it appears that the independence of the local authorities is in a considerable degree a qualified independence, even as regards the administration and execution of laws enacted for their government. Moreover, the laws which prescribe the duties of both the central and the local boards emanate from the same legislative source, and are necessarily concordant. With us the practical difficulty arises from the fact that the central legislature, which establishes the National Board, has absolutely no authority to make health laws for the States, its sole power in this connection being limited to measures necessary to prevent the spread of infectious diseases from one State into another, such power, too, not being expressly granted, but constructively derived from the commerce-regulating clause of the Constitution. This must be kept steadily in view in our efforts to devise a plan for the organization of a National Board of Health, if by such a plan we understand not merely the number of persons who shall constitute the Board and their mode of appointment, but also a definition of the duties to be assigned to it.

I make no apology, gentlemen of the Public Health Association, for having selected as the subject of my discourse a brief history of the steps which led to the formation of the existing National Board of Health, and an account of its operations. I have done this deliberately, in full recognition of my official relations to the Association, and with no further reference to my correspondent relations to the Board than as enabling me to speak with the authority of a personal knowledge of the facts cited. I hold the National Board of Health, as organized under the constituting act, to be the offspring of this Association. It was the product of legislation suggested by your committees specially instructed to use their best exertions to secure such legislation, it being one of the leading objects of the Association, as expressed in the second section of its Constitution, to promote organizations and measures for the practical application of public hygiene. It was, therefore, regular and proper that an account of the action taken by the Executive Committee to secure the desired legislation and of its subsequent results should be reported to the Association, and it seemed to me legitimate and appropriate to discharge this duty in connection with the usual Presidential address.

At the proper time you will be called upon to announce your verdict of approval or disapproval of the proposed amendments to the Constitution submitted last year by my respected predecessor. At that time the views of the Executive Committee will be indicated in the form of a resolution to be presented to the Association.

In this connection I desire the Association to consider the expediency of making an attempt to raise by subscription a fund for the permanent endowment of the secretaryship. The duties of that office are by far too onerous to be imposed upon any member of this body without at least a moderate compensation. I believe that such an endowment could be secured by earnest and persistent efforts, and until it can be accomplished I recommend that the traveling and other necessary expenses of the Secretary while attending the regular meetings of the Association, including the present meeting, be paid out of its treasury.

I cannot close this discourse without again congratulating the Association upon the realization, at a much earlier day than was expected, of its hopes for an official recognition by Congress of the duty of government to provide for the security of the public health by appropriate and adequate legislation. This somewhat unexpected success is due in great part to fortuitous circumstances, without which the best directed efforts of this body might not have availed for many years to come. Still, it may be confidently affirmed that your counsels have molded and shaped the legislation which has taken place, and will not be without weight as to future legislation.

I would fain hope that those who have recently connected themselves with this body under the stimulus of a newly-awakened interest, arising from their desire to stop the ravages of the terrible scourge which has scattered desolation and death over so large a portion of this fair land, will not be satisfied with the extermination of this foe, if, indeed, so desirable a consummation can ever be brought about, but will remember that many another pestilence, walking in darkness with a destruction that wasteth at noonday, will remain to be fought and to be subdued. In this warfare the Public Health Association has a mission not less important, nor less promising as to the attainment of useful results, than that of the National Board of Health, which it has been instrumental in creating.

Especially is this true with reference to suitable sanitary legislation by the several States, without which the efforts of a central Board must necessarily be more or less inadequate to the accomplishment of the ends to which those efforts are directed. I trust, therefore, that there will be no relaxation of effort to make our Association avail as much in the future as in the past, or even far more so, to increase the common stock of knowledge by sanitary studies and investigations, to educate the people in the principles and facts of private and public hygiene, and to promote organizations and measures for their practical application, until all shall have been done which in the scheme of Providence it may be possible to do, to make "life worth living," as well in respect of that most desirable of all its accidental blessings, health of body and health of mind, as it essentially is worth living in respect of that deep, inherent moral worth of which no man can be deprived except by his own acts of sinful rebellion against his Maker.

II.

CITY SCAVENGERING AT BOSTON.

READ AT THE SEVENTH ANNUAL MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION, NASHVILLE, TENN., NOVEMBER 18, 1879.

By ELIOT C. CLARKE, C. E.,
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It is a little singular, that while the removal of filth by sewerage has been so thoroughly studied, and there is such an abundant literature treating of the subject, so little has been written concerning methods and appliances for removing such kinds of filth as must be handled and carted away, work covered by the general term scavengering.

The purpose of this paper is to state briefly how such work is performed in one city. It is not pretended that perfection has been reached, but it is hoped that a statement of the difficulties met with, and results obtained, may be of value, and may encourage those in charge of similar work elsewhere to put their experiences on record, so that from a multitude of such records information as to the most desirable methods may be obtained.

The scavengering of Boston devolves upon a committee of five members of the City Council, chosen annually. This committee in January makes an estimate of the appropriation required for scavengering during the year and controls its expenditure, all work and the employment of all labor being in its hands. It is provided, however, by city ordinance, that scavengering shall be done to the satisfaction of the City Board of Health, and that the superintendent in actual charge of the work shall be appointed annually by said Board, and approved by the Mayor. The Board of Health referred to consists of three members, appointed by the Mayor for three years and approved by the City Council, one member going out of office each year. This Board takes cognizance of all matters affecting public health, regulates noxious trades, abates nuisances, appoints the city physician, quarantine officers, and superintendent of health, and, as has been stated, can require that the scavengering shall be done to its satisfaction.

At first sight this division of responsibility would not seem to promise the best results. The work is in charge of a committee that does not remain in office long enough to know anything about it; it must be done to the satisfaction of a board continually changing, which cannot master its details, and does not control the appropriation, expenditures, or workmen; and is superintended by a man, appointed by one body and responsible to another, who himself holds office for a single year.

And yet the system has worked well. The committee, unable to become familiar with the work during their brief term of office, of necessity content themselves with auditing accounts, and with such investigations and suggestions as they are qualified to make; and leave its management entirely to the Superintendent; the Board of Health, for somewhat similar reasons, appoint each year the same person to that office; and the Superintendent, being supported by both bodies, is relieved from many petty attacks and annoyances incidental to a more autocratic position. Practically, therefore, the charge of city scavengering is in the hands of one man, the Superintendent of Health.

It is obvious that no operation of magnitude, and scavengering less than many others, can be efficiently carried on except by those accustomed to it; and that it is well done at Boston is due almost entirely to the fact that it is in charge of men fitted by long training for its performance. The superintendent has filled his place for twenty years and graduated from an inferior position on the work; all of the foremen, twelve in number, have been promoted from subordinate positions; few of the laborers have been less than five years connected with the department; many have served for twenty, a few for thirty or even forty years. Although the rate of wages paid is not especially high, ranging from forty-five to fifty dollars a month, the permanency of the employment causes places upon the force to be eagerly sought for, and when a vacancy occurs there are many applicants to choose from. A young, able-bodied married man is usually selected. His first instructions are, " Mind your own business; do your work to the best of your ability; don't talk politics; don't talk religion." The men know that a faithful discharge of their duties will ensure continued employment and may lead to promotion. Rarely is one found to neglect his duties. The result is commended to the attention of the opponents of civil-service reform in municipal affairs.

Scavengering includes:—
Removal of house offal.
Removal of ashes and dry house dirt.
Cleaning of streets and street catch-basins.
Cleaning of privy-vaults and cesspools.
These several classes of work will be described in order.

REMOVAL OF OFFAL.

Offal, which includes refuse food and other fragments of moist organic matter, known otherwise as swill, is taken every day from hotels, restaurants, boarding-houses, markets, and other places furnishing large quantities of it, and three times a week in summer and twice a week in winter from dwelling-houses. At about four o'clock, A. M., men leave the department yards, of which there are four in different sections of the city. Each gang consists of a horse, wagon, driver, and helper. The horses are handsome, well-groomed beasts, weighing about 1,400 pounds, and come generally from Pennsylvania. The wagons, built by the city, which also employs eleven mechanics to do its own repairing, blacksmithing, painting, etc., are perfectly water-tight, hold from three to four cord feet, and have a wooden cover or lid which is kept closed except when raised to receive the offal. They cost to build about $250 each. Hanging below them are two large wooden buckets to be used by the men. Hotels and markets are first visited so that the offal may be removed before early travelers and customers begin to arrive. Shortly after seven o'clock dwelling-houses are visited. Midway between the streets, in most parts of the city, are narrow alleys upon which the rear of house lots abut and through these the wagons drive. The driver or his helper rings the bell at the yard gate, or at the basement door if there be no yard, and on being admitted quietly goes to the swill tub, empties its contents into the bucket, replaces the tub and leaving the house passes to the next one, and so on until his bucket is filled, when it is emptied into the cart. Should no offal be found at any house it is assumed that it has been improperly disposed of, and the case is reported to the Board of Health for investigation.

There is nothing offensive in these operations, which proceed till eleven A. M. and from one to five P. M. When the wagon is filled it is driven to one of three department depots in the city and its contents dumped upon a raised platform. The wagon is then thoroughly washed with water and scrubbed clean before going upon another trip. It is required that all the offal collected in a day shall be disposed of before night. There is no lack of regular customers for it, who drive in from the suburbs and neighboring towns. These men back their wagons under a shoot in the platform and a full load is shoveled into them. The cubic contents of each wagon is known, so that proper charges can be made. These range from five to seven dollars a cord, varying according to the accessibility of the depots to the neighboring farms. The wagons are required to be water-tight, and each has a number in plain figures, two inches long, so that it can be reported by the police in case of leakage or any other offense while passing through the streets. From the sale of offal last year was realized the sum of $27,821.22. During the same time 26,000 loads were collected at a cost for labor of $56,346.01, to which must be added about $20,000 for the total cost of removal. Ninety-six men and forty-five wagons are employed upon this branch of the work. While the city claims the right to remove all offal, or, what amounts to the same thing, refuses to license any private individuals to carry it through the streets, a wise discretion is used in exercising the right. Farmers and others living in sparsely settled districts on the outskirts of the city limits occasionally wish to use their own swill for feeding swine, and when this can be done without creating any nuisance it is considered proper and economical to permit it. This discretion is left with the Superintendent.

REMOVAL OF ASHES.

One hundred and seventeen men and fifty-eight carts are employed in removing ashes and house dirt. The carts are for a single horse, and are built by the city at a cost of about $125 each. Hotels, stores, and tenement houses are visited twice a week, and dwelling-houses once. As before, the driver and his helper enter the house, yard, or shed, carry out the ash-receiver, and, after emptying the ashes into the cart, which has a canvas cover, return the receiver to its proper place. The men are not required to go up stairs; and the ashes from tenements and up-stairs offices and warerooms must be brought to the ground floor by the tenants. In dwelling-houses, however, the inmates have no trouble whatever. In most, if not all, other cities ashes, and often offal as well, have to be placed on the sidewalk to await the arrival of the scavengers, and after being emptied, the receptacles are left where found. The Boston method is, evidently a great convenience to householders; by it, also, is avoided the nuisance to foot passengers of having to pass upon the sidewalk unsightly and offensive vessels or heaps of refuse awaiting removal.

It might be supposed that, notwithstanding its convenience, citizens would object to having strange men enter their houses. But it must be remembered that the men employed by the Health Department are rarely strangers. They keep their places for many years. The same men go over certain routes day after day, sometimes for twenty years together. They pass a cheerful "Good morning" at the basement door, and are generally cordially greeted by the servants. It is a custom in most families to present them with a dollar at Christmas, a practice which helps to establish kindly relations. It is worth stating that in the last twenty years there has been but a single complaint made of anything having been stolen by the scavengers. It may be doubted if any class of citizens, with a cleaner occupation, can show a cleaner record.

When the cart is filled, the canvas is fastened securely over its contents, and the driver takes it to the nearest dumping ground. In the mean time the helper, in order to expedite the work, continues to bring out ash-barrels, so that they may be in readiness when the cart returns.

It is somewhat difficult to find accessible places for dumping the ashes; it may be doubted if it is possible to find unobjectionable places. A large part of Boston being very low land, there is great temptation to use this refuse in the place of earth-filling; and such is its usual disposition. If the ashes were perfectly free from admixture with other substances it would form suitable filling for most purposes; but it is not so. Although it is intended by the Health Department that only ashes shall be put in the ash-barrels, no rule to that effect can be enforced. By requiring that there shall always be at each dwelling a receptacle for offal, and by refusing to remove ashes with which offal has been mixed, that species of filth is in a measure kept out of the ash-barrel; an attempt is also made to keep out such substances as go under the general name of rubbish by providing other ways of removing them.

Every spring, at ordinary house-cleaning time, it is advertised in the newspapers that during a certain week the carts of the Health Department will carry away from dwellings any rubbish or house dirt that the inmates desire to be rid of. A printed notice is also left at every house specifying the day on which it will be visited. This is good so far as it goes; but the trouble is that such rubbish is constantly accumulating and cannot be kept till the next spring. When a bottle is broken, an oyster or preserve can emptied, a piece of matting worn out, or a pair of boots discarded, it is desired to be rid of them at once; and in the heart of a city there is no way to get rid of anything except via the ash-barrel. On an average fully one third of each cart load of so-called ashes consists of other refuse.

Portions of this refuse are harmless enough, as, for instance, broken glass and crockery, plaster, old iron and tin ware, but other portions entirely destroy its suitability for filling, such as bones, hair, leather, rubber, paper, pieces of cloth or carpeting, old baskets, and, in short, any vegetable or animal matters liable to decompose. Nearly all small animals that die in the city find a grave in the ash-barrel. How else can they be disposed of? There are not enough of them to deal with separately, and if they are thrown into the streets at night they must be picked up by the first ash-cart and buried at the dump.

The ashes and house dirt are used to grade streets and parks belonging to the city, and private lands when desired or permitted by the owner. In a few cases a small sum is paid to the city for the filling. It is evident that the presence of the refuse house dirt renders the ashes undesirable for street-building, for the mass as a whole compacts very slowly and continues to settle for years. If the surface be paved or covered with gravel there will probably be no smell; but digging trenches for laying gas and water-pipes, sewers and drains, will be an offensive operation for a number of years, since organic matters kept from a free supply of oxygen decompose slowly. The use of such filling for grading open squares and pleasure-grounds is not especially objectionable, except as it may cause offense while being deposited. To support vegetation it must be covered several feet deep with earth and loam, and the trees and plants quickly assimilate and destroy the products of decay. Frequent nuisances have been created by attempts to fill park lands on the borders of the sea. Salt water attacks the refuse matters and liberates foul-smelling gases. Enough sulphureted hydrogen has been generated from half an acre of dumping ground to discolor in a few hours the white paint on all the neighboring houses. It is probably a serious mistake to dump house dirt on land which is to be built upon. It is true that the organic matters mixed with the ashes must in time disappear, but how soon it is impossible to say. Excavations made in Boston in land filled from city carts ten years previously have disclosed remnants of organic matter and the process of decomposition still going on. The risk in living over such land may be very slight, but, however slight, it is a risk of disease and death.

It may be mentioned in this connection that fully two hundred people find a livelihood by spending the day at the different dumping grounds, raking over the loads of dirt as they are dumped from the carts, and collecting in bags and baskets such portions as can be sold to junk dealers. It is a disgustingly dirty and probably an unhealthful occupation; and while a strict utilitarian might rejoice to see how everything of the least value is saved and utilized, a philanthropist might be pardoned for thinking that it would be better to waste a little old iron and glass, than to degrade humanity in saving it.

It has been said that small animals are carried in the ash carts and buried at the dumping grounds. Larger ones, such as horses and cows, are disposed of by a contractor who removes them for the privilege of possessing the carcass. When such an animal dies the police send word to the Health Department, and the contractor at once dispatches a cart for the body. It is taken to an island in the harbor, where every portion, it is said, is utilized, and the operation is very remunerative. It should be so, for it is also very offensive, and, proper precautions not being used, the stench arising from it is carried, by certain winds, three miles to the city. There was paid for labor in removing ashes and house dirt during the past fiscal year, $97,302.65.

STREET CLEANING.

One hundred and eighty-five miles of streets are swept and cleaned each week. Only paved streets are swept, those which are much frequented, daily, others twice a week. Macadamized streets have their gutters cleaned as required, paper and other rubbish being picked up. They are not swept because the process is found to carry off the top sand and detritus to such an extent as to much lessen their durability. Street cleaning is done by daylight, as indeed, are all operations of the Health Department. Night work has been found to be neither efficient nor economical, chiefly because the workmen at night can neither see nor be seen.

Streets are watered before sweeping, the city using six watering carts for this purpose. Men with birch brooms sweep the dirt to the gutters, and others following shovel it into carts, of which there are thirty in all devoted to this purpose. It is then taken to a dumping ground. Nine one-horse sweeping machines with revolving brush are also used. Each of them does the work of eight men, and much more cheaply, but they cannot clean corners and depressions as a broom can. Different kinds of pavements vary as to the ease with which they can be cleaned. Asphalt, either continuous or block, is most easily cleaned; next the Belgian or granite block. New wooden pavements can be made tolerably clean, but dirt sticks to them when old. It is impossible to clean cobble-stone pavement more than superficially.

Forty-eight thousand and fifty-nine cart loads of dirt of forty cubic feet each were collected during the past year, and were disposed of in the same manner as ashes and house dirt, by being used to fill land for streets, parks, and dwelling lots. The street dirt is of a rather uniform character, consisting of earth, road-detritus, fragments of wood, leaves, paper, soot, hair, etc. Under exceptional conditions from well paved streets in the heart of the city a load is sometimes obtained of sufficient manurial value to fetch a small price for use on land, but this is seldom. It is a manifestly unfit substance for filling, both from an engineering and from a sanitary point of view; but what else to do with it is a problem yet unsolved. One hundred and seventy men in all are employed in cleaning the streets, and of these eighty-two are sweepers. During the winter months, when the streets are covered with snow and ice, these men are kept busy sweeping crossings and removing snow from city sidewalks and grounds, while the teams assist in carting away ashes, of which there are more loads to be disposed of at that season. At any season when the streets are very muddy, much frequented crossings, as those near railroad depots, public buildings, and shops, are kept clean by the street sweepers, which is a great convenience to the public. During last year the expense of street cleaning amounted to $83,262.75.

CLEANING STREET CATCH-BASINS.

The street catch-basins, connecting with the sewers, are built by the Sewer Department, which naturally, it would seem, should have the care of them afterwards. But in Boston they are cleaned by the Health Department. Forty-three men and fourteen wagons are employed upon this work. Each catch-basin is cleaned when it requires it. Those near the foot of hills generally need attention after every heavy rain, for those on level ground once a year suffices. The sludge is hoisted by buckets and deposited in a close-covered wagon which carries it to a dumping ground where it is covered with ashes. It has absolutely no value and is not especially offensive. Eight thousand seven hundred and sixty-six loads were collected last year at a cost for labor of $12,940.50.

CLEANING VAULTS AND CESSPOOLS.

Vaults and private cesspools, of which there are from five to six thousand in the city, are cleaned by a contractor, at the expense of householders. The Board of Health, however, exercises supervision over the matter. The contractor is licensed, is allowed to charge a fixed rate of from six to eight dollars per load of eighty cubic feet removed, and is required to use patent odorless excavators. These machines, which are air-tight, have the air pumped out of them and suck the contents of the vault for any distance up to one hundred and twenty-five feet through strong hose. A small charcoal furnace, connected with the air pump, destroys any gases as they are pumped out. The work can be done in the day-time without any offense to sight or smell. The matters excavated are for the most part either taken by scows outside the harbor and dumped, or hauled into the country and buried in pits. Not more than one load in ten can be sold for manure. It is worthy of notice, that although it is sometimes asserted that sewage, or the settlings from sewage, diluted and washed with the whole water-supply of the city have great value as manures, that these concentrated manurial elements of sewage when undiluted are so valueless that the city has to pay six dollars a load to have them carried away.

To summarize the preceding information it may be said that the scavengering of Boston is on the whole good : —

Because sufficient money ($340,000 last year) is appropriated for the purpose.

Because the appropriation is wisely and efficiently expended by officials, outside politics, trained by long experience to the work.

Because the laborers do their work well, being used to it, and knowing that faithful work ensures continued employment.

That the removal and disposal of offal is satisfactorily performed.

That the removal of ashes, house-dirt, street sweepings and catch-basin sludge is satisfactory, but that the disposal of these matters is not so.

That certain portions of city scavengering may be satisfactorily done by contract, under careful and strict regulations.

III.

METHOD INTRODUCED BY THE AUXILIARY SANITARY ASSOCIATION FOR DISPOSING OF THE GARBAGE OF NEW ORLEANS.

By Rev. HUGH MILLER THOMPSON, D. D.,
of New Orleans.

We have choice of three ways to rid ourselves of the *sewage* of a city; but whether we choose water-carriage, pneumatic pressure, or the scavenger cart, the *garbage* still remains.

There seems to be no way to remove this but by the shovel and the cart.

The question then about garbage does not concern so much its removal from our streets, and about our dwellings, as the disposal of it after such removal.

A favorite method in New York was, and I am not sure but is, to use it to fill lots sunken below the street grade. The deposit of hundreds of tons of mingled ashes, cabbage stalks, rotten potatoes, and other kitchen refuse mingled with dead cats, rats, and the like, as the foundation for a future dwelling, does not strike one as being a wise sanitary proceeding for the present, or the future, nor one that commends itself to the tastes or the nostrils of civilized people.[1]

Still, one can see that in such disposal there is an element of economy which commends itself to the merely business mind. The lot needed filling, and kitchen sweepings were a convenient and cheap material. It is not, to the strictly business mind, and especially to the official mind, any part of its business to look farther.

If in New York, where earth and rock are easily obtainable, such a practice was found economical, it is no wonder that in New Orleans, where clean dirt is very scarce, exceedingly dirty dirt should be used in its place.

There was a "dumping ground," so-called, established back of the narrow city on the edge of the swamp, and thither were brought the dead dogs and cats, the kitchen garbage and the like, and duly dumped. This festering rotten mass was picked over by rag-pickers, and wallowed through by pigs — pigs and humans contending for a living in it. And as the heap increased the odors increased also, and this mass lay corrupting under a tropical sun dispersing its pestilential fumes where the wind carried them.

But streets needed filling and lots also, and here to the official eye of the contractor was a quarry ready at hand for the purpose.

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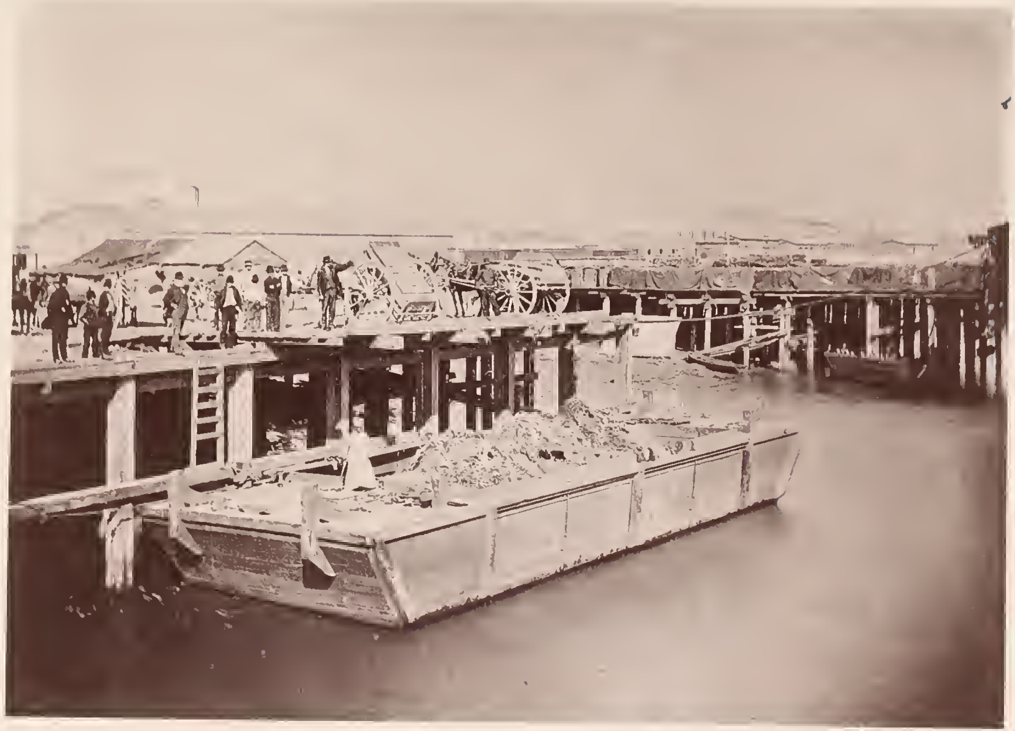
[1] The present Sanitary Code of New York prohibits the use of garbage and all vegetable and animal waste for the filling of sunken lots, and the practice has for many years ceased. Whenever a contractor is detected in depositing any improper material with his filling, he is at once arrested and punished by fine or otherwise.



GARBAGE SCOW IN USE AT NEW ORLEANS.

Will it be believed that, actually, this horrible compound of offal, carcasses of animals, refuse of kitchens, and sinks, this mass of reeking abomination was carted back into the city, and used to make streets and fill up hollows, dumped back again, before the doors and windows of people who had not been sentenced to death for any crime!

In a letter to the Board of Health upon the subject of a complaint that a street contractor was "burying dead dogs, etc., in the middle of Jackson and Phillip Streets," the Administrator of *Improvements* (*!*) defends himself by saying, "It has been a long established custom to deposit offal, etc., on vacant squares in the various districts of the city. I believe it to be an advantage to place them on some of the low streets, where mixed with ashes etc., they can be used in raising the grade of such streets, and rendering them passable!"

This officer was only carrying out the traditions of his office, doing as everybody else had done, in thus disposing of offal, garbage, and carcasses, and but for the epidemic of 1878 which followed, it might be going on still.

When the Auxiliary Sanitary Association was formed last year, one of the first practical questions which came before it, was this of the disposal of garbage and offal.

That the hitherto prevailing practice of utilizing it for street making and lot filling would not answer was pretty well settled. Whether the yellow fever of the previous summer was or was not intensified by filth, the Association did not care to debate. On the general principle that rotting garbage and dead dogs are not a healthy compost for macadamizing the streets of a great semi-tropical city, they determined to dispose of these substances in some other fashion.

There was talk of cremation. It seemed impractical and expensive. There was talk of utilizing the garbage by converting it into a fertilizer — a beautiful and attractive plan which, clearly, in the rich lands of Louisiana at least, would not pay, and which would still necessitate the use of "a dumping ground," and the handling and picking over of the filth.

There remained the river. It runs by New Orleans with a velocity of from two to four miles an hour. Its depth is between one hundred and two hundred feet. It is a vast swift body of water, the accumulated drainage of half a continent. It was seen that nature had provided, as usual, for man's needs, if only man had the sense to use the provision. Once in the Mississippi River the garbage would be sent about its business for good.

The daily accumulation is about five hundred cart loads. The city is narrow, and long, having a river front of seven miles closely built.

The Auxiliary Association built and presented to the city three scows, costing $1,550 each. They are placed at special wharves along the harbor front, and to them the garbage carts are driven, and into them dump their contents. At 4 P. M., each day, a tug picks up the scows, tows them two miles down the river below the city, where the garbage is dropped into the stream, and disappears in the devouring jaws of gar pikes, catfish, and the other greedy denizens of the great stream, who attend in countless numbers at their daily dining hour. What is spared by them is whirled away in the waters, and not a trace of any part of the offensive matters can be discovered four miles below.

The scows are thoroughly washed out by the powerful steam pump of the tug, and clean, sweet, and odorless, are returned to their respective wharves.

These scows have so thoroughly performed their duty, and have proved themselves in rough weather such good sea boats, that an explanation of their construction may not be amiss.

The scows are sixty feet long by twenty-two feet beam over all on deck, bottom fifty feet long by twenty feet wide over all, raking fore and aft five feet, depth over all eight feet, dump compartment or hold, thirty-six feet long to bulk head, capacity two hundred and fifty cart loads.

Two doors on each side swing on strap hinges, and are fastened by sliding bolts. It is found that these bolts can be raised without difficulty, permitting the doors to swing freely outward, causing a sudden and complete discharge of the load.

The boats are loaded from a wharf which projects over the boat to the centre fore and aft. When the carts are dumped their contents fall equally into both sides of the hold, the floor of which slopes to each side at an angle of forty-five degrees.

It will be seen, that the load pressing against the doors, it is only necessary to raise the bolt in order that the contents should slide instantly into the water.

A diagram of these scows accompanies this paper.

IV.

THE SEWERING AND DRAINING OF CITIES.

A PAPER READ AT THE SEVENTH ANNUAL MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION, NASHVILLE, TENN., NOVEMBER 18, 1879.

By GEORGE E. WARING, Jr.,
Newport, R. I.

(*The system here described is the one adopted for the City of Memphis.*)

The president has asked me to prepare a paper concerning the most perfect methods of city sewerage, one which may serve as a standard of comparison in considering the character of existing work. It would savor of presumption to describe or to prescribe methods radically different and better than those now in use. It is impossible to foretell the improvements which are to grow out of the present rapidly-increasing interest among intelligent and ingenious men in all that relates to sanitary practice. If I were to attempt now to set forth the details of a perfect system of sewerage, I fear that my recommendations, like those for Dr. Richardson's City Hygeia, would exceed what practical men and investors of capital would accept.

The most that it is prudent to do is to consider the question in its purely sanitary bearings, and to indicate in what way the best requirements of public health may be met, in the light of our present knowledge.

So far as we can judge of the future from the indications of the present, it would seem that in one respect we are to witness a very marked change in the practice of sanitary engineering. There is much reason for believing that there will be a distinct separation between the application of sewerage to the removal of domestic and manufacturing wastes and soil-water, and the construction of conduits for the protection of public and private property against the action of storm-water. This latter, like the construction of roadways and bridges, will be treated as a purely civil-engineering question, having at best only an indirect sanitary relation. The interests of public health, so far as sewerage is concerned, will, in my opinion, be best served by a close adherence to the collection and removal of foul waters, and to their proper final disposal.

This suggestion is not new. The discussion between the advocates of the combined and the separate systems of sewerage, especially in England, has long been active. The issue between them seemed doubtful until the matter of agricultural or chemical purification of the effluent became prominent.

The arguments in favor of the exclusion of storm-water from the sewers proper seem to me so conclusive, that I no longer hesitate to accept such separation as essential to the best sanitary sewerage.

Sewers large enough to remove storm-water, according to the usual formulas, are open to several serious objections : —

1. The question of cost is so often the controlling question, even in improvements of the most vital importance, that the expense entailed by the construction of storm-water sewers constitutes an insuperable obstacle in the case of many a small town where sewerage is most necessary. Even in the larger cities the expenditure in this direction might sometimes, if not always, be economized for the benefit of other necessary work.

2. The larger the sewer the more difficult becomes the matter of its ventilation.

3. Cases are extremely rare where sewers of the storm-water size are not, at least during the dry and hot season, sewers of deposit to such an extent as to have their air made most foul by the decomposition of their sediment.

4. Where the question of final disposal has become important, the admixture of storm-water with the sewage leads to the constant embarrassment of the system, whether the process be chemical or agricultural.

There seems to be no controlling reason why storm-water should be admitted to the sewers at all for very long reaches of the streets ; and not seldom, throughout the whole of the smaller towns, the whole rainfall may be discharged over the surface without causing inconvenience.

Until about 1854, the cities of Albany and Troy, both large towns, and both having very steep grades, terminating on level ground, had no storm-water sewers. The inconvenience caused during heavy storms was inconsiderable, and there was practically no material injury to public or private property. I am informed by the engineers of both cities that neither inconvenience from the overflowing of the streets nor injury from wash constituted an essential argument in favor of sewerage. The sewers were built to the storm-water rise only in conformity with the general custom.

The carrying of surface-water to a depth of ten or fifteen feet below the surface, seems to be at least unnecessary. Street-wash can be safely admitted to sewers only after passing through settling-basins, and these are sure to accumulate an offensive and dangerous amount of decomposing filth.

I believe that one of the most important improvements that we are destined to see, is the removal of storm-water, as far as possible, by surface gutters, — carrying away the greater accumulations through very shallow conduits, largely, perhaps, through covered gutters, easily accessible for cleansing and flushing.

This part of the engineering problem being satisfactorily provided for, the sanitary drainage of a town — the removal of the wastes of its population — becomes a simple problem. It implies, however, one condition which, although almost unknown in America, has been shown by foreign practice to be an attainable one, — that is, it requires that the streets be kept clean by some other means than occasional drenching by storms. There is no more inefficient, costly, and dangerous scavenger than the rain which falls upon the surface of our roadways, and washes their horse-droppings into the catch-basins at the street corners.

In my judgment a perfect system of sanitary sewerage, for a small town or a large one, would be something like the following: —

No sewer should be used of a smaller diameter than six inches, (*a*) because it will not be safe to adopt a smaller size than 4-inch for house drains, and the sewer must be large enough surely to remove whatever may be delivered by these; (*b*) because a smaller pipe than 6-inch would be less readily ventilated than is desirable; (*c*) and because it is not necessary to adopt a smaller radius than three inches to secure a cleansing of the channel by reasonably copious flushing.

No sewer should be more than six inches in diameter until it and its branches have accumulated a sufficient flow at the hour of greatest use to fill this size half full, because the use of a larger size would be wasteful, and because when a sufficient ventilating capacity is secured, as it is in the use of a 6-inch pipe, the ventilation becomes less complete as the size increases, — leaving a larger volume of contained air to be moved by the friction of the current, or by extraneous influences, or to be acted upon by changes of temperature and of volume of flow within the sewer.

The size should be increased gradually, and only so rapidly as is made necessary by the filling of the sewer half full at the hour of greatest flow.

Every point of the sewer should, by the use of gaskets or otherwise, be protected against the least intrusion of cement, which, in spite of the greatest care, creates a roughness which is liable to accumulate obstructions.

The upper end of each branch sewer should be provided with a Field's flush-tank of sufficient capacity to secure the thorough daily cleansing of so much of the conduit as from its limited flow is liable to deposit solid matters by the way.

There should be sufficient man-holes, covered by open gratings, to admit air for ventilation. If the directions already given are adhered to, man-holes will not be necessary for cleansing. The use of the flush-tank will be a safeguard against deposit. With the system of ventilation about to be described, it will suffice to place the man-holes at intervals of not less than 1,000 feet.

For the complete ventilation of the sewers it should be made compulsory for every householder to make his connection without a trap, and to continue his soil pipe to a point above the roof of his house. That is, every house connection should furnish an uninterrupted ventilation channel four inches in diameter throughout its entire length. This is directly the reverse of the system of connection that should be adopted in the case of storm-water and street-wash sewers. These are foul, and the volume of their contained air is too great to be thoroughly ventilated by such appliances. Their atmosphere contains too much of the impure gases to make it prudent to discharge it through house-drains and soil-pipes. With the system of small pipes now described, the flushing would be so constant and complete, and the amount of ventilation furnished, as compared with the volume of air to be changed, would be so great, that what is popularly known as "sewer-gas" would never exist in any part of the public drains. Even the gases produced in the traps and pipes of the house itself would be amply rectified, diluted, and removed by the constant movement of air through the latter.

All house connections with the sewers should be through inlets entering in the direction of the flow, and these inlets should be funnel-shaped, so that their flow may be delivered at the bottom of the sewer, and so that they may withdraw the air from its crown; that is, the vertical diameter of the inlet at its point of junction should be the same as the diameter of the sewer.

All changes of direction should be on gradual curves, and, as a matter of course, the fall from the head of each branch to the outlet should be continuous. Reductions of grade within this limit, if considerable, should always be gradual.

So far as circumstances will allow, the drains should be brought together, and they should finally discharge through one or a few main outlets.

The outlet, if water-locked, should have ample means for the admission of fresh air. If open, its mouth should be protected against the direct action of the wind.

It will be seen that the system of sewerage here described is radically different from the usual practice. I believe that it is, in all essential particulars, much better adapted to the purpose of sanitary drainage. It is cleaner, is much more completely ventilated, and is more exactly adapted to the work to be performed. It obviates the filthy accumulation of street manure in catch-basins and sewers, and it discharges all that is delivered to it at the point of ultimate outlet outside the town before decomposition can even begin. If the discharge is of domestic sewage only, its solid matter will be consumed by fishes, if it is delivered into a water-course, and its dissolved material will be taken up by aquatic vegetation.

The limited quantity and the uniform volume of the sewage, together with the absence of dilution by rainfall, will make its disposal by agricultural or chemical processes easy and reliable.

The cost of construction, as compared with that of the most restricted storm-water sewers, will be so small as to bring the improvement within the reach of the smaller communities.

In other words, while the system is, in my judgment, the best for large cities, it is the only one that can be afforded in the case of small towns.

Circumstances are occasionally such, as in St. Louis, as to require extensive engineering works for the removal of storm-water through very deep channels. Ordinarily, as I have before said, the removal of storm-water is a very simple matter, if we will accept the fact that it is best removed, so far as possible, by surface gutters, or, in certain cases, by special conduits placed near the surface.

It is often necessary, in addition to the removal of house waste, to provide for the drainage of the subsoil. This should not be effected by open joints in the sewers; because the same opening that admits soil-water may, in dry seasons, and in porous soils, permit the escape of sewage matters into the ground, which is always objectionable. Soil-water drains may be laid in the same trench with the sewers, but preferably, unless they have an independent outlet, on a shelf at a higher level. When they discharge into the sewer, they should always deliver into its upper part, or into a man-hole at a point above the flow-line of the sewage.

There is one point connected with the drainage of towns which is not sufficiently appreciated, especially in this country, — that is, that it is easy and cheap to secure a deep outlet in low land, and to deliver sewage at a considerable elevation for agricultural treatment, by artificial pumping.

The average cost of pumping for water-works is about nine cents per foot of elevation for each million gallons raised.

On this basis the cost of raising the sewage of a town of ten thousand inhabitants, supposing every three persons of the population to contribute one hundred gallons per day to the flow, would be about three cents per day for each foot of elevation.

Even supposing that twenty inches, or about one half of the annual rainfall, finds its way into the subsoil, the cost of lifting this ten feet to a surface outlet would, on the same basis, cost only about one hundred and sixty dollars per annum for each one hundred acres of the town area.

Both of these estimates are practically somewhat too low, because a small amount of water cannot be lifted relatively so cheaply as a large amount. I give these figures only to show that, with a community of any considerable size, it is really a matter of minor consequence whether the natural outfall is high or low.

The experience of Holland, in the practice of drainage, indicates a complete relief for the natural disadvantages even of the city of New Orleans, of which the cost would be quite insignificant as compared with its benefits.

Many of our riparian towns, dependent upon high-lying water as the outlet for their drainage, or, like Chicago and Milwaukee, delivering their foul drainage into streams whose contamination means the contamination of the town itself, may find their only practical relief by means of an artificial outlet. The city of Boston is now establishing a conspicuous example of the application of mechanical power to deep drainage and distant removal, — even applying this means for the discharge of the rainfall of an enormous area.

Aside from its benefit in securing deep drainage, discharge by pumping makes us quite independent of natural topography in adopting means for agricultural disposal. Pumping, and the separate removal of foul wastes, puts it in our power, under all circumstances, to adopt this means for purifying our outflow. Along our greatest rivers, from the sanitary stand-point, the disposal question counts for nothing. The Mississippi River will annihilate the sewage of St. Louis, to whatever size she may grow; but there is an enormous proportion of our towns which must, for purely sanitary reasons, adopt some other means of outlet than delivery into rivers and harbors.

There is an agricultural consideration, and an important one, which looks to the utilization of all our sewage; but in the present condition of our agriculture, this must remain a secondary argument. Wherever we resort to irrigation as a means of purification, the manurial value of the sewage will serve to lessen the cost of our work. Probably it will nowhere repay the whole cost.

The methods of irrigation disposal are various, and all are not equally well adapted to all conditions. The outflow of a large town can be purified satisfactorily, either by simple irrigation over large areas, or by intermittent downward filtration over much smaller areas of land properly graded and deeply underdrained. Under this system the discharge is intermittent, and during the intervals the soil-filter is purified by atmospheric action.

The outflow of smaller towns, of public institutions, and of suburban and country houses may be much the most satisfactorily treated by the absorption-drain or sub-surface irrigation system, working in conjunction with Field's flush-tank. By this system a small area of land, naturally or artificially well drained, is underlaid, at a depth of ten inches from the surface, by a series of open-jointed, agricultural drain tiles. At each discharge of the flush-tank, the accumulated sewage is sent rapidly into the tiles, whence it escapes through the open joints into the soil. During the interval between the discharges, the water purified by filtration, settles away to the subsoil, and fresh air enters, to supplement, by oxidation, the purifying action of the roots of the grass or other crop growing on the land.

This latter system has now been so thoroughly tested under various conditions, as to climate and quality of soil, as to have proved itself of almost universal applicability. It has the very great advantage that, as the sewage never appears at the surface of the ground, it may be carried on in immediate proximity to the dwelling. It would be equally effective, under proper arrangement, in dealing with the sewage of cities ; but for such use it would be much more costly than would the removal of the sewage to a distant field, where surface irrigation would be unobjectionable.

I trust that, as I am neither a Southerner nor a physician, I may be excused for attaching more importance than many of you probably do to the proper drainage and cleansing of a city, and to the proper disposal of its outflow, and more than to any system of quarantine. My knowledge of the history of the yellow fever epidemics in this valley is infinitely less than yours ; but I feel warranted, and I take my warrant from the history of the plagues which devastated the filthy mediæval cities of Europe, and from my own knowledge of the want of cleanliness and want of drainage in the city of Memphis, in venturing the suggestion that even that fever-smitten town may be made an impossible field for the invasion of yellow fever in an epidemic form.

While yellow fever is for the moment uppermost in all our minds, and while its sudden and more fatal outbreaks strike the public imagination with peculiar force, we should, as sanitarians, never lose sight of the fact that it is one of our minor diseases ; that, indeed, along the banks of the Mississippi River, far greater mortality, and infinitely greater disability, result from the constant operation of diseases which should come equally within our purview, and which are equally preventable by measures of sanitary improvement.

V.

UNDERGROUND SEWERS.

PRESENTED AT THE SEVENTH ANNUAL MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION, NASHVILLE, TENN., NOVEMBER 18, 1879.

By J. W. COMPTON, M. D.,
Evansville, Ind.

The protection of human life and the preservation of health are objects that not only claim the attention of sanitarians everywhere, but call forth their deepest and most earnest solicitude.

Whatever destroys life, or impairs health, they regard as a public enemy, and at once their combined energies should be called into requisition to utterly destroy such enemies, or to render them powerless to inflict injury.

That underground sewers in populous cities may be fraught with great danger to both life and health no longer admits of a doubt.

These grave charges once conceded to have an existence in any particular locality, it at once becomes the duty of the guardians of the public health to devise ways and means for the speedy and effectual removal of such dangers.

It being the object of the meetings of the American Public Health Association to make available the combined experience and observation of every section of our country, it becomes the duty of some member, from every city, town, and village, of this broad land, to impart such experience and observation as he may be in possession of, that the combined wisdom of all may aid in providing efficient and prompt remedies for any existing causes of danger to life and health in the particular locality in which he lives.

The impression I have of this duty leads me to speak of the dangers that threaten the citizens of Evansville. If these were dangers for which sanitary skill and experience could offer no remedy, it would be needless to array them before this association.

I do not regard them as being without remedy, and ask for advice as to the most prompt and economical measures for removing these dangers.

The air of the city is now — and the evil has been gradually growing in proportions for several years — largely and needlessly contaminated by foul pestilential and offensive gases, created by substances subject to decay and putrefaction being permitted to be drained or placed in unprotected sewers situated in the most populous parts of the city. In a dense population of forty thousand inhabitants we have within the city twelve miles of underground sewers, and several miles more may be added by house connections and drains from breweries, tanneries, and various manufacturing establishments and industrial pursuits, tapping the sewers for the disposal of their offal.

These, in some instances, extraordinary privileges, though exceedingly detrimental to the purity of the sewers, are permitted by an ordinance of the city council.

One item, at least, should receive particular mention.

Twenty-one slaughter-houses are connected with and drain or empty their offal into the sewers.

Our sewers were constructed to avoid overflows of property from rainstorms, to aid surface drainage and diminish the amount of malarial fevers once prevailing there.

These praiseworthy objects have been most admirably accomplished, but in their unprotected condition, with four open inlets at each street-crossing, giving free exit to the poisonous gases engendered within them, with one hundred miles of graded streets, principally emptying their accumulated animal and vegetable filth and surface drainage into the sewers, with the offal from slaughter-houses, tanneries, breweries, etc., commingling with the dejections from the sick and well, from water-closet connections, our sewers are rapidly becoming elongated cesspools, reeking with filth and animalcule life, and generators of enteric diseases, typhoid fevers, and dysentery, much more incorrigible and fatal than the malarial fevers, because quinine will not cure them.

A few words in reference to this poisonous vapor, this deadly sewer-gas.

With an indescribably horrid stench it invades our homes night and day, when the wind from the direction of the sewers blows towards us; it invades our dining-rooms, at meal time, when we would above all things desire pure air while partaking of the food that nourishes our bodies; it invades our bedrooms while we sleep, and when we walk upon the streets we are compelled to breathe an atmosphere polluted and rendered disgustingly offensive by this pestilence-carrying sewer-gas, which escapes from hundreds of untrapped inlets and drains, and may at any time convey to our citizens the germs of infectious diseases, which germs have an identity as distinct as that of a grain of wheat, a bird, or an acorn.

Fortunately we are not compelled to breathe this noxious element in its condensed form constantly, or our lives would be short indeed.

Admitting that infectious diseases maintain through ages their specific characteristics, the condition of sewers, as described, would prove a fertile soil, elongated hot-beds for the propagation and rapid multiplication of disease germs that find their way into them, and the dense sewer-gas would become a ready carrier of them to an exposed population.

Our sewers have not sufficiently steep grade to be self-cleansing; heavy rain storms often occur at such irregular and long intervals as not to prevent dangerous and offensive deposits in them, putrescent animal and vegetable deposits, sending off through the open inlets and the various drains into them, offensive, dangerous, and deadly vapors in immense quantities. I am aware that it is highly improper, in sewers of slight inclination like ours, to admit slaughter-houses, breweries, soap factories, water-closets, waste steam from engines and boilers, to drain into the sewers the objectionable offal they produce ; yet all these abuses and more, I am sorry to admit, do exist, and the pertinent question of how we may best rid our city of this great source of danger forces itself on our attention. We have some thirty sewers. The first one was constructed in 1857, and a new sewer, or the extension of an old one, has been constructed in each succeeding year to the present time. The older sewers are the most foul and offensive, but as none of them can claim a greater age than twenty-two years, they are all rapidly approaching the conditions of the older ones.

VI.

REMARKS UPON NECESSITY FOR THE FILING IN A PUBLIC OFFICE OF PLANS AND STATEMENTS ABOUT CERTAIN MATTERS OF HOUSE CONSTRUCTION.

UPON THE STUDY OF THE ORIGIN OF CONTAGIOUS DISEASES, AND THE LIABILITY TO ERROR IN THIS DIRECTION.

UPON THE NECESSITY FOR UNIFORMITY IN THE PUBLICATION OF VITAL STATISTICS.

PRESENTED AT THE SEVENTH ANNUAL MEETING OF THE A. P. H. A., NOV. 19, 1879.

By DR. EDWARD G. JANEWAY,
Health Commissioner, New York City.

No subject possesses more interest to dwellers in a city at all approximating to New York in the conditions of its growth and restriction of area, than that relating to the construction of habitations. I believe, that the time has come when people who desire to purchase a house should have opportunity of gaining access to full particulars about its construction. As it is, the purchasing or leasing of a house is almost as much of a lottery as buying a horse of a jockey. The purchaser or lessor is to find out what he can; and has no means by which he can become reasonably sure of some of the most important facts. There is a need that not only a plan of the building, but that of the plumbing also, should be filed in some public department.

A statement should accompany this plan giving full particulars on the following points: —

1. What was the nature of the ground upon which the house was built, and of the material used in filling such ground, if this was done?
2. Was there any old water-course under the house?
3. What was the character of the drainage of house ground, foundations, and lot belonging to house?
4. What was done with the exterior of foundation wall?
5. What kind of material was used in the plumbing, and how were the pipes joined to one another?
6. Is the house connected directly and independently with the street sewer? or if not with how many other houses is it connected?

The people are at the present time more alive, than formerly, to the necessity of obtaining in their dwelling-houses such conditions of plumbing, air supply, and sewerage, as shall prevent deleterious influences arising therefrom. Many are, however, still insensible to the importance of the subject in all its relations. They claim that those arrangements which were good enough for them and their families in the past, are good enough now; and that if they have had a defective construction for years, they have experienced no ill effects therefrom. As knowledge of these subjects is more and more widely diffused, the number of these obstructionists is becoming lessened. The method, which has been suggested above, of requiring a plan and particulars about the arrangement and material used in plumbing, sewering, etc., to be filed, would soon lead to an improvement in the construction, as well as to the selection of the best means for achieving the results desired. For the presentation to the public of different plans for the accomplishment of the same end, would cultivate a spirit of discrimination, especially when in the selection of a house, as would not infrequently happen, one was to be distinguished from others only by its relative excellence in these respects. The writer has had personal occasion for this information which he believes so desirable; and by interview with a number of persons has found how necessary it is considered by others. Not a few people have come to him anxious to know how or where they could ascertain certain, or all, of these facts about houses which they desired to lease or purchase. Moreover, it is practically impossible to obtain a view of these things for one's self at the time of, or previous to, the taking a house. A plumber is usually employed to investigate the matter of plumbing and sewerage; but so many cases have come to the writer's knowledge of the unsatisfactory results of such procedure, that he feels that relief can only be obtained by the measure proposed. Let us look at what an investigator can accomplish. He must be content with a superficial inspection; and trust for most of the information to the statements of interested parties. He is unable to tear out walls, or dig up cemented cellar floors, or pull out the foundation. He can observe whether the main soil pipe is extended above the roof of proper size, and if each independent line of pipes is so extended. He can see if there is a proper trap under each basin, etc., and whether these traps are properly ventilated. Looking further he can find whether there are safety pans beneath basins, and perhaps learn where and how these discharge. By introducing some essential oil in the pipe in an upper story, or on the roof, leaks may be detected, or defective traps be discovered. In some cases the traps are placed out of sight, so that though he may be able to affirm their existence when seen, the reverse may not be true. It would require an experiment extending over a longer time than is allotted by either plumber or experts to ascertain if a new house is properly connected with the street sewer. So also the nature of such soil-pipes as are beneath a cellar floor, as well as their degree of inclination, and their connection with those of other houses, must be a matter of doubt. Let me relate an experience which I had some time since upon one of these points which will best illustrate some of the difficulties in ascertaining the condition of plumbing hidden beneath ground. A gentleman leased a new house of a prominent builder, who with his partner had constructed this and another next door like it, for their own residences. He assured the gentleman and myself, that a proper sewer connection existed, as he had built the house for himself, and as his partner lived in the adjoining one, similar in all respects, there seemed to be no reasonable doubt of the statement. The house was otherwise well built, and the plumbing good, except that it contained an arrangement novel to me, but the best to be imagined for distributing sewer gas in a house. The cold air for the furnace was taken in a passage under the cellar floor, so as to be delivered at the bottom of the cold air chamber. In the course of this air duct a man-hole existed, at the bottom of which was a small gutter leading to the sewer to carry off such water as might enter. This was on advice filled up and the duct constructed as usual. On the occasion of the first rain storms the cellar was flooded and fecal matter deposited on the cellar floor. An investigation which followed showed that no connection with the street sewer had been made, though the contractor, who had undertaken to do this for the builders, was one whom they had employed for years. The owner was chagrined beyond measure, and had the matter immediately righted. Such an experience is startling, and demonstrates the necessity for more careful examination than is usually made. If there were time, we could give illustrations of a similar nature only more aggravated, because willful. You may ask how could such a mistake be avoided, and what means can be recommended by which one could ascertain about the connection with the sewer. We would reply that by employing a reliable person to go into the street sewer, and watch for a discharge, when water, of a color which had been previously determined on, should be poured into the house pipes, a purchaser could become certain about the matter. Instances in which houses have been sold as of perfect construction, when all the joints of the soil-pipe were simply made by placing one end in the other without calking, etc., have not been very uncommon. These cases convince me that not only is the plan which we have mapped out a necessity, but that a severe penalty should be attached for wrong information. The law should be so framed, that the penalty could be claimed from the original builder of the house, and such agent of his as had had the charge of this part of the construction. Much of the trouble arises from speculative builders, contracts being given at prices which are barely remunerative for poor work and material. These defects of plumbing and sewerage are not, however, the only ones of a serious nature. The penetration of impure ground air into the house atmosphere is more or less prolific of disease. Houses built upon a foundation of filth of different varieties, or upon a ground constantly moist from obstruction to natural water-courses, or defective drainage, need great care and outlay of money to secure a proper cellar construction, one which will as far as it is possible keep out these soil emanations. Maps are to be obtained in New York city which show the old water-courses, and the position of such filled in ground as has been reclaimed from the river. But it would be difficult for a purchaser to assure himself of the nature of the material used. The grading of the city has led to filling in which has not been mapped out, and about this a purchaser might have doubt. There is a probability, too, that the building which has been done, has to some extent altered the course of some of the old streams; for instance, we saw a house constructed on piles in a location where the map showed no old water-course, and at the bottom quite a stream ran. One would certainly desire the knowledge, that the house he was inspecting with an intention of purchase, was erected on piles. At present in New York, it is impossible to fill in ground intended for building purposes with bad material, as to a certain extent this matter is under the control of the Board of Health, who will refuse applications for the use of garbage, or ashes to any extent contaminated with such material for such purpose. Yet in rapidly growing cities there may exist a need for the precaution. The permeability of brick, wood, and stone, are too well known to need mention here ; yet many people have an idea that surface dampness is the only danger to which they are liable in cellars. The position of the mouth of the air-duct for furnaces is usually considered of little moment. This is so accessible to observation, that perhaps no necessity would exist for filing it with other matters mentioned except as a convenience. I might add that considerable carelessness exists, and such air is taken not infrequently from the worst possible places, over the site of garbage receptacles, drain openings, etc. In this connection it might be added that it would be wise whenever possible, to construct the soil-pipe in the cellar above ground, of iron, so as to be in full view of any one desiring to inspect it. Those who have paid any attention to the matter, know the trouble arising from brick sewers in cellar grounds, the liability of earthenware to be broken, when exposed. Some have objected to iron on the ground of its becoming coated with refuse material. Yet the advantages in other respects offset this disadvantage.

In New York we have, under the enactment of a new law, secured the inspection of the greater portion of the tenement-houses, in order that an account might be kept of the condition of each, and of its relation to health in the future, as well as to secure the information of present sanitary defects, and obtain their correction. This law I consider one of the greatest blessings to the poor and middle class of the population of the city, as well as a decided step forwards in the matter of sanitary reform. Its main features are : 1. A limitation upon the amount of ground to be covered to sixty-five per cent. of the lot, unless special means for light and ventilation exist, and except in the case of corner houses. 2. An absolute restriction that ten feet shall be left in the rear of every such house, between it and the rear line of lot. The Board of Health may, if special reasons exist, diminish the space. 3. The population of these houses are allowed six hundred cubic feet of air-space to each person, and the Board of Health may, if deemed necessary, compel the owner to limit the number of people in the house, if in excess. 4. No dark rooms are to be allowed. Each habitable room must open, by a window of twelve square feet area, upon the street, yard, or upon a court or air-shaft, this latter to be constructed upon a plan approved by the Board of Health. The Board has adopted, as a minimum, a shaft twelve square feet in area, and at least two feet in width. The carrying out of the provisions of this law promises to secure for the new houses marked benefits over the older ones, many of which were erected before attention had been turned to the necessity of a proper sanitary condition in the homes of the poor. It should be added that, as a rule, builders and architects appreciate the wisdom of the law, and comply with its requirements willingly. At the suggestion of Prof. C. F. Chandler, president of the Board, cheap photographs have been made of each plan presented, and these, with the applications, are filed away, serving as a means of preventing a construction different from that for which a permit was obtained.

CERTAIN FACTS RELATING TO THE STUDY OF CONTAGIOUS DISEASE.

No subject should possess more of interest for the sanitary officer than that relating to the control and nature of contagious diseases. Dr. Richardson has contributed his ideas on the subject in his little book denominated "Hygiene." The city there described, Utopian at present, will be approached in the future. In these remarks I desire to draw the attention of members of the Association to a matter which I believe of considerable moment to the future of sanitary science. We are very frequently treated to theories about the origin of contagious disease based upon a limited observation, in a particular place, uncontrolled by the knowledge to be obtained by a wider survey of the field, which is the world. These, when emanating from sanitary authorities, I regard as dangerous to the right progress of that which all have at heart. If such are recorded, the data which accompany them cannot be too full, and every circumstance which could modify the opinion expressed, or offer another explanation, should be stated. The more I study this problem, the more value I place upon the statement of negatives. By this I mean that the observer or writer shall state, "I examined for this thing and for that, but they could be excluded." The reason for this is that some other worker going over the ground desires to know how rigidly any given examination has been conducted, and in how far information has been obtained on such points. One of the most important questions to be considered by sanitary officers relates to the possible spontaneous origin of contagious diseases, or rather of those diseases which we consider essentially developed by contagion at the present day. For the study of this question, large cities, as a rule, are poor places. Too many possibilities are generally present, and in many instances we cannot be positive. Conversely, isolated cases in country towns, villages, and, still better, on farms, afford splendid opportunities for such study. I regret to say that these advantages are very generally neglected, because of the erroneous opinion on the part of the country practitioner, who is apt to feel that he can offer nothing to his profession, in the way of thought, which would be of value, in contrast with that emanating from his city brother, with his wider field and larger experience. I hope that I may be able to induce some of those so situated to engage in such examinations, so carefully conducted as to extend to the minutest details capable of having any, no matter how little, bearing upon the elucidation of this problem. I have for several years past endeavored to stimulate young medical men to undertake this work, but so far with apparently but little of success ; I hope that they are not waiting because they fear that their practice has not reached those proportions which would enable them to generalize. If each State Board of Health would impress upon those practitioners, favorably situated for such study, the desire of the profession, and their duty in this matter, I believe that we should soon acquire quite a mass of facts bearing upon these knotty points. I hope that it may not be considered out of place if I allude briefly to the manner in which it appears to me that such an examination should proceed. For illustration, we will suppose that a case of scarlet fever had occurred to a child on a farm. The following series of questions suggest themselves : —

1. A set directed to ascertaining that the disease was contracted on the farm, and not at some other place ; where the child has been, and when, to be carefully investigated.
2. A set directed to prove that it was not due to any one who had visited the house, bringing the poison with him or her.
3. A set directed to prove that it was not introduced by anything which had been brought to the house.

The wide ground covered by these interrogations, and the necessity of going into minutiæ to acquire valuable information, will be apparent. As chairman of the sanitary committee of the Board of Health in New York, the writer prepared a series of these questions in order to ascertain the source of origin of variola, with a view to prevent the spread of that disease. Some may object that this work is unnecessary, because they believe that these diseases are always developed by contagion. I would reply that whilst I share in a great degree this conviction, I would none the less examine, as closely as possible, each case at all favorably situated for throwing light upon the subject. By so doing we shall acquire a mass of facts, of which we shall be enabled to say, that so many cases arising in this position and in that, with such and such a temperature, at this or that season of the year, on different soils, at varied elevations, etc., only proved that in no case was the spontaneous origin tenable, if such should turn out to be the fact. But this would not prove the only value of such investigations. They would add to the existing knowledge of these diseases, informing us more definitely of the incubation stage of some of them, as a single definite exposure to the source would be more easily proved than is the case in a city. I desire to follow these remarks with allusion to two of these diseases, and with reference to the supposed spontaneous origin of the one, and the contagious nature of the other. The question has been raised as to whether the refuse of slaughter-houses getting into sewers and drains did not prove favorable to the development of scarlatina, or even form a nidus for it. Our experience in New York is not corroborative of this ; for we have had as much proportional disease in other situations as in the neighborhood of these places. Yet, to show how easy it is to find certain facts which seem to a certain extent corroborative of such a theory, I would draw attention to the few deaths reported from scarlet fever at Paris and Edinburgh. The former has so little as to occasion surprise. Each of these have public abattoirs, and these are removed from the centres of populations. A singular fact is also mentioned in the reports of the Massachusetts State Board of Health. In the volume for 1875, it is stated that a severe epidemic of scarlet fever occurred at Brighton. The volume for 1873 speaks of the location of the abattoir at Brighton. One of the physicians alludes to the refuse from this place as possible cause for the disease. The value of this case is offset by the knowledge that Boston suffered from a severe epidemic of the disease, notwithstanding the removal of the slaughter-houses to Brighton over a year before. The fact of the small number of deaths from scarlet fever at Paris is deserving a careful investigation, and is a matter of international importance as regards its cause. I have arranged from our reports some figures which will illustrate the matter in a better way.

City.	Population. 1877.	Deaths. 1877.	Deaths from Scarlet Fever. 1877.	Deaths. 1878.	Scarlet Fever. 1878.
London	3,533,484	77,002	1,576	83,695	1,792
Paris	1872 1,851,792	48,747	93	49,135	61
New York	1878 1,083,371	26,203	983	27,008	1,099
Berlin	1878 1,033,632	29,910	915	30,725	871
Philadelphia . . .	876,118	16,004	379	15,743	554
Vienna	727,271	20,606	238	21,643	228
Moscow	1871 601,979	—	—	23,492	577
Liverpool	1878 532,681	13,904	225	15,584	947
Brooklyn	1878 549 438	11,362	730	11,075	363
St. Louis	1878 503 000	5,660	33	6,002	36
Chicago	1878 450,000	8,103	819	7,422	133
Glasgow	1878 545,737	13,758	132	14,055	190
Boston	365,000	7,284	113	6,733	141
Cincinnati	280,000	4,428	29	4,823	435
Baltimore	365,000	9,022	597	6,733	141
Edinburgh	218,000	4,636	20	4,864	42
Bristol, England . .	206,000	4,415	45	4,409	36
Rome, Italy . . .	282,000	—	—	6,815	47
Naples, Italy . . .	457,453	—	—	15,195	17
Dublin	314,000	8,795	122	9,269	132
Havana	250,000	10,217	3	11,507	5

Perhaps these tables might have been extended, but they suffice for the object which I have in view. That is, to bring out the marked difference in the mortality reported from this disease in these different places. The question comes, Why has Paris, the second city in point of population, only 154 deaths from scarlet fever in 97,882 deaths from all causes during these two years? Does it depend upon the slight prevalence of the disease; or upon its mild character, or upon the fact that cases dying from any complication are not considered as dying from scarlet fever, or upon some error in the tables? This is a matter in which we are all interested, and I would suggest that this Association recommend to the National Board of Health an investigation of this matter, as such an examination can be conducted with more propriety and expedition by them than in any other way. With reference to St. Louis, which reports a mortality from this disease only a little larger in proportion to population, there are those here who are probably competent to answer, or can do so at the next meeting of the association, after due inquiry. I might add that, as far as Paris is concerned, we have not been able to get satisfactory answers to interrogations. The reading of French works on medicine would not lead us to believe it an infrequent disease, nor always so mild as the death statement seems to make it. I would here draw the attention of those who believe that scarlet fever arises from filth, bad sewage, etc., to Havana, which has a less mortality for a series of years from this disease than any city in the list; and yet, if I am rightly informed, there are few dirtier cities. It should be stated that in all cities the disease has its periods of decline and of increase, each extending over two or three years, and in rare cases over a number of years. Yet all these things being considered, neither New York, Philadelphia, nor London, even if we go back for a period of years, show such marked freedom from the disease as Paris.

I have always believed, as far as New York and other densely populated cities were concerned, that the poison does not die out, and only needs that enough persons should exist who have not suffered from the disease for it to become an epidemic.

The other disease to which an allusion was made is yellow fever; and the comment I desire to make is with reference to the study of the supposed contagious nature from what happens in one place only; and I would draw the attention of those who are disposed to believe in contagion as the main cause of the disease to that which has been noted in New York and vicinity.

1. New York has had yellow fever in the past, — in 1822 for the last time. Hence we cannot suppose that there are conditions of its soil, climate, etc., which render its occurrence impossible.

2. Yellow fever prevailed at Bay Ridge in 1856, and on Governor's Island in 1870, from August until November.

3. Governor's Island is but a stone's throw from the city, and the winds at that season of the year blow from the island, more or less frequently, over New York.

4. At the time when the yellow fever prevailed at these two places, New York was subject to the same climatic influences, and if the disease could develop on Governor's Island and Bay Ridge, there could be no ground why the temperature, moisture, etc., should not favor its development in New York.

5. Cases taken sick on Governor's Island, or rather having received the poison there, were treated at their homes in New York in bad localities, and yet no development of the disease occurred.

6. These facts seem to indicate that the disease is not propagated by contagion, — certainly was not on that occasion.

7. It is possible that there was an absence of some condition of soil, etc., which did not allow of the infection of the locality by the emanations from the sick.

It seems to me that this is the only possible contingent upon which we an act in removing patients, in contra distinction to their effects, if such patient becomes sick with yellow fever at a place where it is not prevailing; also that in view of the magnitude of the interests at stake, it is wise to remove patients with yellow fever from a large city, so long as this possible infection of the place by the person is a matter of doubt.

Now if the reasoning had been based simply upon what occurred in New York and vicinity at the times mentioned, we should take the ground that the person did not infect the place. But the knowledge of what has occurred at the South makes us hold our opinion upon this point in abeyance, and to act for the good of the city in a manner stated under the seventh head.

THE NECESSITY THAT STATISTICAL PUBLICATIONS ON HEALTH, DISEASE, AND DEATH SHOULD BE UNIFORM THROUGHOUT THE WORLD.

Every student who examines a mass of figures purporting to be the statement of the number of deaths, etc., in a given place, desires also to know in how far these figures are accurate and complete representations of that to which they pertain. It is sometimes said that figures cannot lie. Nothing is more erroneous. Figures are often twisted to suit the occasion. In the preceding remarks I have had occasion to express the desire to know upon what basis certain figures are placed in the published statements of cities. Let us see in what directions differences are likely to obtain, and how they may be so obviated as to serve uniformity. We will consider the death-rate of cities which is in a measure taken as a criterion of the health of a place. The first error which creeps in is with reference to the population of a city in the periods between the taking of a census. It seems to me desirable that the increase should be calculated by a decimal which shall represent the rate at which a city grew between the previous censuses. This may turn out to have been too small or large; but it is the only safe method, and it is extremely easy, when the census has been taken, to go back and correct any errors which have arisen. The guess that a city has grown so much, is too unreliable to pass muster at the present day. Hence I believe that it would be a good plan to compute the death-rate at so many per thousand of population living at the time of the last census, and at so many per thousand as computed at the time of writing. For this reason at my suggestion the Register of Vital Statistics of New York has placed in our table of comparative statistics the population of each city at the last census, and as estimated by the authorities, in separate columns. I can see that New York is growing far more rapidly within the last two years, than in the three preceding. The reasons for that increase are to be found in the improved facilities for reaching the upper portion of the city afforded by the elevated railroads, and in the improvement in business. The latter has probably obtained in other places, and produced some increase.

The second error arises from excluding from the total of deaths in a place a certain number which are included in other places. Let us study how this may occur. We have in the first place an illustration in our neighbor, Brooklyn. The county institutions are located outside of the city limits at Flatbush, and to these a great number of the pauper sick and insane are sent. More than ninety-five per cent. of the population of Kings County live in the city of Brooklyn, and almost the whole number of deaths at the Flatbush institutions should be charged to Brooklyn. This number is about five hundred in the course of a year. There is another way in which this misleads, and that is with reference to the deaths from some forms of disease. If a statistician of the future should in his investigations of disease compare New York and Brooklyn as derived from published statements, he would be struck by the difference in the number of deaths from insanity in the two places. Again, as the small-pox hospital is also at Flatbush, he would find the number of deaths from this disease considerably less in the latter than the former city. The same would be true of other diseases. In the corresponding institutions in New York the death-list is over two thousand a year, and it can be seen how considerable a reduction would be made by abstracting these from the sum total.

A third source of error relates to the disposition made of foundlings. In some cities there is no asylum, home, etc., for these stray waifs of humanity; in other cities they are sent into the country to be nursed; in others they are retained in institutions outside the city limits; in still others in institutions within the city. The number of foundlings who die each year in New York city is in the neighborhood of six hundred. The institutions for the care of these little ones invite the deposition of those belonging to other places. A fourth circumstance is also likely to change the figures. The custom obtains in some cities of deducting the number of those prematurely born, who die, whilst in other places such deaths are added to make the sum total. Philadelphia, for instance, excludes these; New York adds them to the deaths, — increasing the amount by five hundred to six hundred in different years. Again, in some cities it is customary to exclude from the number of deaths for the year such as occur to non-residents. In New York we have an emigrant hospital, and formerly as many as five hundred have died there in the year; now the number is only about eighty or ninety. We have included these, and the cases of those non-residents who have died in the city, in the total number of deaths.

The last cause of difference to which I shall allude relates to the computation of the number of deaths from the returns made by the officers of cemeteries to the health authorities. This method I believe to be decidedly faulty, and statistics so obtained should be received *cum grano salis.*

Now these matters are, it seems to the writer, of sufficient importance to cause this Association to use its influence in favor of obtaining uniformity in the method of arranging and publishing vital statistics, as well as of securing the most accurate method of obtaining the number of deaths in each place.

Again, it seems advisable that deaths occurring from contagious diseases, and from the complications and sequelæ, should all be considered under the head of the primary affection. But the desire for knowledge, as to what the causes of death in these complaints have been, should be gratified by having a table arranged in the following manner, using scarlatina as an illustration.

1. Deaths due to scarlatina directly.
2. Complications and sequelæ, — Pneumonia.
   Pleurisy.
   Nephritis.
   Abscess of neck, etc.

This could be repeated under the head of each disease in which complications or sequelæ occasion death, and would greatly enhance the value of statistics. May the writer suggest to the Association the propriety of passing a resolution of the following nature?

Resolved, That, in order to obtain uniformity, the vital statistics of each city give the following information: —

1. Whether the sick, paupers, or insane are sent to institutions outside of the limits of the city; and whether, if such sick, paupers, or insane die, they are returned as deaths in the city or not. If not so returned, then the number of such deaths should be stated.

2. What provision is made for foundlings? Are they retained in the city, or sent outside its limits? How many foundlings die in the course of a year?

3. A statement should be made of the ground upon which the increase of population is based.

4. Each city should state in an appropriate place the number of those who have died from premature or preternatural birth; to what length of time it extends this as a cause of death; and whether it has added such deaths to, or subtracted them from, the total number of deaths occurring.

5. That the Association advise that each city should require permits issued by its Board of Health, upon the certificate of a physician, as a necessity for burial.

6. That it should be stated upon each publication of vital statistics emanating from any source, whether the deaths of such non-residents as have occurred have been included in the number of deaths.

These embody the sources of discrepancy to which my attention has been drawn. At my suggestion, the register of vital statistics of New York has asked for information upon these points of many cities, and the result will be published in the forthcoming volume.

VII.

ON THE PROTECTION OF THE INNOCENT AND HELPLESS MEMBERS OF THE COMMUNITY FROM VENEREAL DISEASES AND THEIR CONSEQUENCES.

By ALBERT L. GIHON, A. M., M. D.,

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Responsibilities of the American Public Health Association as the guide and instructor of the community in sanitary matters. — Its duty in this connection respecting venereal diseases. — The dangers incurred from these diseases by innocent women and children. — No correct idea of their extent derivable from medical statistics, — rheumatism, scrofula, cancer, etc., concealing a large proportion.

Efforts of European nations to exterminate them. — The Italian, French, and German systems for the repression of prostitution as contrasted with its conspicuous toleration in the United States.

No need for meretricial regulations or police control of prostitution. — A general sanitary service only necessary to protect the public health against preventable diseases, whether venereal or pythogenic. — Medical men the proper sanitary officers, — preventive medicine being the most important and most honorable office of the physician.

The American Public Health Association has assumed to be the instructor and guide of the community in sanitary matters. Its self-imposed mission is to teach men how they should live to enjoy the greatest possible health, that not only the highest happiness which this earth affords may be the lot of every living being, but that the progressive development of the human race may be advanced by the strength and beauty of its individual members. It says as well to the lowly poor as to the exalted and rich that there can be no bodily vigor without a liberal supply of wholesome food and water; that the polluted air weakens the brawny arm of the Hercules, and clouds the brain of the Milton; that a grimy skin and sordid attire are not only inconsistent with physical well-being, but with those mental graces which make the gentleman and gentlewoman. To instill these truths into the minds of every man and woman and child is the acknowledged duty of the sanitarian; and since to live long and well and happily is the aim of every human being, however rich or however poor, no one should rebuke his zeal when he preaches a crusade against the vices by which men heedlessly disfigure that body, which must itself be sound to be the home of a sound mind. Day by day these preachers of the gospel of health are multiplying, and their voices are heard in every quarter, urging men to come forth from the squalid hovels and squalid palaces they have ignorantly builded, and in which they drag out feeble existences, into the pure air and bright sunshine, which can alone make them god-like men. But, while the sanitarian is allowed to teach us what we should eat and drink, how we should clothe ourselves, how our dwellings should be built, our land tilled, and our children reared, there are other acts, which help make up the economy of life, to which he is expected to be not only blind, but dumb, and, until recently, the field thus barred against him, he has himself not sought to enter. The delicate questions which concern the phenomena of which the end is the very reproduction of the species, and upon the healthy performance of which depends its future weal or woe, are shrouded with the impenetrable mystery of ignorance. The young man and the young woman emerge from their chrysalis adolescence into the butterfly world, to be attracted and dazzled by the first bright light, only accidentally fortunate if their beauty and life are not forever withered by the fierce fire that had seemed to them so fair. When the simplest teachings of the sanitarian are unheeded by even the most intelligent and enlightened members of society; when whole races eat food so cooked that dyspepsia becomes their national characteristic; when our own wives and daughters deliberately torture their shapes, and invite disease into their misplaced organs; when we, who have come here, have had to sit and sleep in cars funky and foul from neglect to use even the wretched means of ventilation provided, and are at this very moment breathing an atmosphere that is unwholesome, what reason have we to expect that the greatest of life's mysteries, whose normal working is vital to the race itself, shall not work that race's ruin? Grant that the individual may play what havoc he chooses with himself and his happiness, society has the right to demand that self-indulgence shall bring no evil to a single other being than the transgressor; and, hereafter, it will look to the public health officer to close up the avenues to disease, which lead from this as from every other centre of violated rightful living. The fetid sewer, which pours its typhoid emanations into a neighborhood, is quickly cleansed; the sufferer with small-pox or scarlet fever is carefully isolated from communication with his fellows; the frightened victim fleeing from the yellow-fever district is ruthlessly driven back from the refuge he would seek, and his dead body and everything he has touched are buried out of sight; but the infected prostitute lives to ply her calling undisturbed, often under the very shadow of the house of God, and the foolish youth, whom no hand has stayed from going after her, "straightway, as an ox goeth to the slaughter," enters her house, and comes forth a leper, to be the father of lepers. What have the wisdom and the experience of the civilization of this century done in this country to counteract the ignorance and the inexperience of this abandoned woman and this heedless boy, and prevent them sowing the seeds of a pestilence whose victims outnumber those of any other known malady? A few hundred human beings have died of yellow fever this summer; how many thousands, blighted by venereal disease, have, during that same time, crawled from the wayside into obscurity, to linger silently for years, but just as certainly to die before their time, — to die, not like the fever's victims, whose loathsome bodies, wrapped in their own loathsome cerements, are hidden in the grave, but to die not till they have transmitted their fatal heritage to long lines of sufferers!

I am not here to argue the necessity for prostitution, though I might quote, in this connection, the testimony of St. Augustine, whose experience in the world before he abjured it enabled him to look on the things of earth with eyes not blinded by the glare of a longed-for heaven. Society, which makes marriage impossible for the young, whose natural impulses lead them to mate, is responsible for its existence. The maddening misery of hunger and want, the blinding sting of unrequited toil, the despair of unredressed wrong, on the one hand; and on the other, the wretched shams of social life, vanity, folly, extravagance, the love of dress, the passion for display, even in this age of civilization, fill brothels to overflowing, and fallen Eves tempt willing Adams as when the world was young.

The sanitarian may heartily amen the prayer of the earnest follower of the church, who would deter men and women from this as from all other wrong-doing; but while the evil exists it is his duty so to hedge it in that it may not prove a quicksand to unwary travelers; and we of this Public Health Association can no longer evade the serious responsibility which devolves upon us. If it is our mission to wage war upon the dragon disease which assails the human race, we must spare none of its brood. We must not slay cholera and yellow fever and typhus and small-pox and the plague, and let syphilis live. The drunkard who murders his wife and child, or his neighbor, is bound hand and foot; why shall we allow the harlot to poison our sons to death, or the libertine to torture his own wife and child with the life-long agony of incurable disease? Your guileless daughter bestows her heart upon the youth of her choice, and seals her trust with a maidenly kiss, pressing her pure lips to lips which she had more safely pressed were they jaundiced with yellow fever. Your helpless infant is fondled by a polluted nurse; your wife poisoned in her household duties by a diseased house-maid; your son, whom you have studiously avoided instructing in the physiology of his own manhood, is led unresistingly, because ignorantly, to make that one false step, from the consequences of which no after-repentance will ever deliver him. You yourself use your friend's pipe, or drink from a public cup, or take the proffered oyster with your glass of beer from a fork that has already done duty with a questionable predecessor. You are shaved and your hair is brushed in a public barber shop where the syphilitic has preceded you. You sleep in hotels, steamboats, and palace-cars under sheets and blankets which are not always changed with each new occupant. You unsuspectingly encounter the steward who prepares your meals, the cook who has cooked them, and the mess attendants who have served you on board the passenger steamship, though they may be all diseased; and if you live in one of the large cities the whiteness of the products of the Chinese laundry tempts you to send your linen to be sprinkled with the saliva which an infected coolie dexterously emits in a fine spray from between his teeth. I am not sketching horrible demons of fancy. Every intelligent medical man who listens to me knows that I am only putting frightful facts in simple words which have no double meaning. "In the town of Brivé fifteen women contracted syphilis from being attended by a midwife who was suffering from chancre on the finger, and the women in turn affected their husbands and their children;" and, Blyth goes on to say, "the jurist must allow, however rare or improbable in practice, that any of the venereal infections may be produced by such accidents as using a public latrine, the seat of which is soiled by infectious matter, by drinking from an infected cup," etc. My friend, Dr. Bailhache, of the Marine Hospital service, only a day or two ago, told me of three stewards from European passenger steamships who were in the Bedloe's Island Hospital with mucous patches in their mouths. In my own experience I have known a sailor confined in hospital by an amputated leg to contract a venereal sore on his visit to a closet the first morning he had been allowed to hobble out on crutches; and I have been consulted by an estimable matron of a hospital for a troublesome skin disease she feared she had contracted from handling the linen which had been used by some of the "nasty patients," who finally confessed her own fault, and was dismayed to learn that she, and not the patients, had made the linen nasty. I have seen one of the brightest ornaments of our profession, a former naval surgeon, go to an early grave with syphilitic disease of the spinal cord, the result of the digital examination of a patient who had an unsuspected vaginal chancre. Finally, you have only to go to the German spas or our own Hot Springs, with professional eyes, to see ladies and gentlemen by thousands seeking relief for so-called chronic rheumatic, cutaneous, and nervous diseases, who have had all their hopes of earthly happiness blighted, many through no guilt of their own, by this fearful, preventable malady.

Since I first broached this subject, at our annual meeting at Boston, three years ago, I have waited for some action on the part of the Association in this matter. Recent appeals to me by men of prominence from various sections of the country have determined me, without further delay, to take the initiative in urging you to instruct the public in this important field of sanitary science. That community which tacitly fosters prostitution by indifference and inaction dares not resent your interference, nor be deaf to your warnings. So long as even little girls openly play the strumpet in the public streets of Boston and New York and Philadelphia, perhaps too in Nashville, pseudo-Christians shall not cry "shame" nor "silence." The very evening of the day when I was gently urged in Boston not to press the matter of the sanitary supervision of syphilitics upon the Association, I saw four little children, the eldest scarcely in her teens, boldly soliciting men on Washington Street; while the day after, five young girls, with slight attempt at caution, sought roommates among the passengers on one of the Sound steamers. Every now and then the family newspaper publishes detailed accounts of raids upon houses of ill-fame, and gangs of poor creatures are dragged through the broad daylight of the streets into the police courts in the name of morality; but how many spurious dentists' offices, and dressmakers' rooms, and cigar shops stocked with empty boxes, are undisturbed year after year in the busiest streets of the large cities! How many so-called boarding-houses, and medical electricians, and electric baths, occupy the most fashionable quarters, where the respectable tradesman is not permitted to have his shop! So long as prostitution exists, it must be in some way controlled, regulated, or restrained from its full measure of evil. Christ did not spurn the adulteress; but there are false assumers of Christ's name who would look upon these unfortunates as dead to reformation, and who claim that venereal disease is the punishment designed by a merciful Creator for the sin of immorality, and therefore ought not to be eradicated. I have known of one such false physician, who refused to treat a poor sailor who begged relief from the "horrors" he felt approaching, because this was God's finger laid on him for his debauchery. As well smite your breast and idly cry, "God's will be done!" and believe that in his divine providence He has sent diphtheria to rob you of one after another of your little children, while you leave untouched the fetid sewer beneath your dwelling.

There is no need to read a long array of figures exhibiting the proportion which venereal diseases bear to other affections of the human system in medical records. From the very nature of these diseases, and the concealment practiced respecting them, these figures, however alarming, understate the truth. Dr. Sturgis estimates that in New York at least fifty thousand cases are going about, many of them, it is the appalling fact, in a condition favorable for conveying the disease. Even the sick returns of the army and navy are inexact, general terms, like rheumatism, concealing a great proportion of chronic syphilitic and gonorrhœal disease; but even the number of acute cases appearing under proper nosological heads show how seriously the efficiency of these branches of the service is impaired by these diseases alone. The facts, too, that there are schools of medicine with special chairs for professors of diseases of the genito-urinary apparatus, that there are distinguished practitioners whose professional work is almost entirely restricted to this class of cases, and that there are portly octavos devoted to them, speak sufficiently of their prevalence. But these are not lessons and cases and books that are published broadcast. The student and his teacher, the patient and his physician, are reticent of their knowledge; and the general public, therefore, is profoundly ignorant of the presence in its midst of these fatal maladies. Every adult of any experience is of course aware that houses of prostitution outnumber churches and schools in every city in the country, but very few suspect how immensely greater is the number of smaller establishments, where a couple of women live together, or where one alone plies her trade. None imagine — for they could not do so and remain any longer indifferent—how rapidly, ceaselessly, surely, these myriad mills of evil are working the impairment of the physical strength of this country. *Rheumatism* is written over graves prematurely filled by strong men crippled in their prime. *Scrofula* hides the secret sin of the parent, stamped on the wasted form and slender frame of the invalid child. *Cancer* is the foul lie which is buried with the wife, who has silently suffered a life of the most excruciating agony which human flesh can endure. Who is there among us that can impiously attribute to a good God the deliberate purpose to make these little children, these gentle mothers, victims of such horrible tortures in expiation for sins committed by others!

If Christian hearts cannot sympathize with the unhappy outcast who has wedded sin, nor seek to save her from any of the hideous dangers which attend her calling, lest they seem to countenance her vocation and make it less repulsive; if they have no pity for the heedless youth who, for one moment, it may be, listens to folly and follows sin, but must leave him to rush blindfold to his doom, lest they seem to deprive debauchery of one of its terrors; if the trumpery deity they have fashioned in their own image and endowed with their own petty and vindictive hates must have these sinners sacrificed upon his altars, in the name of Him who said, "He that is without sin, let him throw the first stone," I appeal to those honest and earnest lovers of their kind, who dare to bear His name and seek to walk in His footsteps, no longer to refuse to protect the innocent and the helpless, at least, if none others, from that beside which death were a blessing. In their names, in the names of these horrible wrecks of humanity, whose pictures I exhibited at our last meeting, innocent children, yet only horrid shapes of children, condemned before their birth to lives of hideous deformity and ceaseless agony, I appeal to this Association to undertake the task of banishing venereal disease from this land.

Other nations have successfully begun the attempt. Spain and Portugal lie side by side. I have passed three successive winters at Lisbon, without a case of venereal disease coming under my observation among three hundred men and officers accustomed to frequent the city, and in the following springs have sailed for Cadiz, a sea-port of the same character, and but two hundred miles distant, where, under similar circumstances, almost every sailor, and not a few who were not sailors, who visited the shore, returned diseased. In the one, there was a strict sanitary surveillance of the public women; in the other, the government ignored their existence.

In Italy, prostitution is under the rigid control of the sanitary service, of which the *personnel* consists of a Chief Inspector, Inspectors, Delegates, Sanitary Officers, Medical Examiners, and Police Watchmen. The Chief Inspector is the head of a bureau of the Ministry of the Interior. One Inspector resides in each of the principal cities, a Delegate in the smaller, and a Sanitary Officer in every district, where such is considered necessary. The woman detected in prostitution, or publicly known to be guilty of it, is privately summoned before the Sanitary Officer, who endeavors to dissuade her from her life, ascertains who are her relatives, communicates with them, and makes every effort to reclaim her. If she persists, she is registered, watched, and regularly examined, that she may not contract, or, having contracted, that she may not communicate, disease; and in Sicily I was told that nuns of certain religious orders were sanitary examiners, for the opportunities it gave them of seeking the reformation of their fallen sisters.

In France the sanitary surveillance exercised over public women is still more thorough and exacting, and it is exercised in such a way that it is rather a system for the repression of prostitution than for its toleration and encouragement. Experienced and capable sanitary agents examine the candidate for registration on the list of public women. Her antecedents are adroitly ascertained by gentle treatment and kind inquiry. The abominable character of the career she seeks to enter is depicted. She is counseled, advised, urged to return to her home, or, if that has been closed to her by unforgiving relatives, she is commended to the various associations of benevolent women, who are ready to aid the erring daughter to return to the paths of virtue. If she is perverse, determined upon her course, and old enough to decide for herself, the fatal entry of her name is made on the police registry, and she is, from that hour, watched every day of her life, imprisoned within confines as impassable as stone walls, shackled with stronger bonds than manacles of iron; the sweet garb of womanhood is stripped from her, and all unsexed she enters the dread abode of sin, in form a woman, without her gentle spirit and pure soul.

Briefly, without considering the organization of the French Sanitary Service and its method of administration, the repressive measures instituted by law against the class of unfortunates, who are thenceforth known as public women, are as follows: —

They are required to report at least once every fortnight to the Health Office for examination.

They are forbidden to entice to debauchery at any time during the day.

They cannot appear on the public thoroughfares until half an hour after the streets lamps have been lighted, and at no season of the year before 7 P. M., nor remain there later than 11 P. M.

They must wear a simple and respectable costume, which shall not attract attention either by its costliness or the brilliant colors of material or its extravagant style.

They cannot go bareheaded.

They are forbidden ever to speak to men accompanied by women or children, or to address a provocation to any one in a loud voice or persistent manner.

They cannot, at any hour or under any pretext whatever, show themselves at their windows, which must be kept constantly closed and furnished with curtains.

They are forbidden to stand on the public streets, to collect in groups, to walk in company with each other, to promenade backwards and forwards in too limited a space, or to cause themselves to be followed or accompanied by men.

The vicinity of churches and chapels for at least twenty meters, all covered passages, the gardens and borders of the Palais Royal, the Tuileries, Luxembourg, and Jardin des Plantes are prohibited to them.

The Champs Elysées, the Esplanade of the Invalides, the outer Boulevards, the quais, bridges, and in general all deserted and obscure streets and localities are also interdicted.

They are expressly prohibited from frequenting public establishments or private houses where prostitution is clandestinely encouraged. They cannot go to tables d'hôte. They cannot live in buildings where there are boarding or day schools, nor occupy apartments outside of the locality in which they dwell.

They are forbidden to share their room with a mistress or another public woman, or to occupy a furnished apartment without authority.

They are cautioned in their own houses not to do anything which shall give rise to complaints by neighbors or passers.

Is this a life into which any woman can enter without a shudder? Could the narrow wicket, leading into this dread abode, be more difficult to pass were it studded with massive bars and bolts, or swung on shrieking, creaking hinges? Who that enters does not at once look longingly towards that broad, open door at the other side of this vile prison, through which the sunlight streams, and outside which stand good angels with downcast eyes and arms outstretched to clasp their repentant sister?

In Hamburg, the control of the police over prostitution relates not only to the acknowledged prostitutes, but to all those who harbor them, and extends to illicit intercourse generally.

Prostitutes are strictly prohibited, (1) to allow any young man under twenty years of age to visit their rooms, or to have sexual intercourse with them; (2) to undress out of their sleeping apartments, especially in public rooms; (3) to expose themselves unnaturally; (4) to allow dancing-music, card-playing, etc., except as permitted by the police authorities, and then only until midnight; or (5) to commit any act whatever of public misdemeanor.

They are not allowed to appear publicly in low-cut dresses, nor to leave their dwellings in the afternoon between two and five o'clock, from March till September, nor to be out after 11 P. M. without a male companion, nor to drive in open carriages, nor visit public saloons and places of amusement, nor sit in the parquet and lower tiers of boxes of theatres, nor to knock on their windows, nor address men in the street, nor write letters to men, nor make appointments with men at hotels or public places.

What do we, the foremost race in Christendom, do to repress prostitution? Nothing. Virtuous nothing? No, — criminal nothing. The higher we rank in self-complacent godliness, the less we do. We see the streets, especially the fashionable thoroughfares, thronged with harlots, conspicuous by their natural beauty or their skillfully added charms, by the extravagant richness and fashion of their attire, by their magnificent equipages and their immodest demeanor. We meet them in the theatres, the concert saloon, the ball-room, and at the hotel-table. We elbow them in the great shops and stores, and we pull our wives and daughters aside, in the hope that their feminine curiosity will not induce them to inquire, Who are these gay birds, of such brilliant plumage? If they do not learn from each other, if the mother neglects to instruct her daughter, the morning papers will give the street and number of Madame So-and-So's splendid establishment, which was raided by the police the night before, and its elegantly attired inmates brought before a magistrate, fined, admonished, and discharged to return to their former abode, or, if that has been broken up, to be scattered to a dozen new sites.

Is it not better that the red light and conspicuous number should mark the door of the strange woman, "in the twilight, in the evening, in the black and dark night;" that the closed blinds and sombre stillness should silently say, "My son, remove thy way far from her; come not nigh unto the door of her house, lest thou give thine honor unto others and thy years unto the cruel," than that the brazen affectation of respectable callings in reputable neighborhoods should make it possible for men and women to frequent them without concealment and without fear of detection? Is it not better that the poor creature, driven by want, or wrong, or folly, or ignorance, by love of dress or innate wickedness, to seek the harlot's calling, should be met by the law's representative, the official guardian of the public health and public morals, advised, admonished, aided, opposed, or, when all else fails, sternly and forever watched and restrained, than that sham Intelligence Offices should allure young girls to ruin, and an army of merry wantons openly recruit their ranks from among the hungry, ill-clad daughters of honest toil?

This is the age of responsibilities. With greater enlightenment and advanced civilization come higher obligations of man to his fellow-man. The mother and father are culpable who allow their sons and daughters to be ignorant of the pitfalls which beset their way in life: society is criminal which allows these pitfalls to exist without the signal-light and sign-board which should mark their site: the American Public Health Association will be equally guilty if it neglects any longer to instruct society in its duties in this, as in every other matter which concerns the public weal. Let it speak the truth plainly and fearlessly, but gently and decently, so as not to shock the sensibilities of truly Christian people, aiming to accomplish only good, without giving a tacit encouragement to vice by making its ways less thorny or repulsive.

There is, however, no need to wound any one's sensibilities by an elaborate system, such as the French, Italian, Portuguese, or German, based upon the official recognition and organization of prostitution. "In Denmark and Norway," says Surgeon Thomas C. Walton, U. S. N., to whose able reports I am indebted for many other valuable facts, "while prostitution is looked upon as an ineradicable vice, yet by the mere application of the ordinary laws relating to disorderly characters, and those for the suppression of contagious diseases, through the energetic action of the sanitary board, this vice and its consequences are, probably, held under better control than in any other part of Europe."

It is undeniable that prostitution exists undisguised in our midst, as it existed when Tamar sat among the harlots on the way to Timnath, and enticed Judah, and when Moses issued his sanitary edicts regulating the commerce of the sexes, but with prostitution itself, we need have nothing, avowedly, to do. The inmates of brothels have already learned that it is their interest to protect themselves. Our purpose is to protect the pure and guileless against contamination by venereal disease, as against small-pox and yellow fever. To do this, it is only necessary to establish a well-organized sanitary service, with its agents or inspectors in every hamlet, village, town, and city of the country, subordinating them to county superintendents, controlled by Municipal or State Boards of Health. Let these agents discover filthy streets and habitations, disease-breeding workshops and factories, foul drains and sewers, and poisoned water supplies; let them ferret out the progenitors of not one but every contagious disease, whether brought by vessels from abroad, or transported from contiguous neighborhoods by railway, or the offspring of indigenous unsanitary conditions, and, having discovered, be empowered to isolate and exterminate them; let them, too, track syphilis to its lair, and whether in man or woman, in any way, at any cost, let them make it impossible for another human being to come within its baneful influence. Every case of small-pox is required to be reported, and its victim carried to the pest-house, or otherwise effectually shut off from contact with his fellows. Why should not every case of this greater evil likewise be reported, and its victim cared for in the lock-hospital, if need be, not for his own sake alone, but for the safety of those whom he cannot touch without defiling? The inebriate is lifted from the gutter, and the fiery liquid which has stolen away his brains poured upon the ground, for the sake of his wife and children. Why should not the poisoned draught be snatched from the libertine's lips, one taste of which may be enough to blight his children and his children's children?

There is an army of doctors overspreading this country, and it is annually recruited by thousands. Why not transform these men, of whom so many idly and hungrily await the prey stricken down for them by disease, into busy workers, keenly on the scent to avert that which they now cannot but welcome? It is a noble office to relieve pain and suffering, and to prolong the life of each feeble invalid; but at the same time it is ignoble to feel that the physician can only fatten and live by the sorrows and agonies of his fellow creatures. However earnest, zealous, and unselfish in his mission may be the young physician when he first practices his vocation, soon domestic cares and family needs will make him watch with greedy eyes the advent of disease, which is to feed and clothe his children. With what sharper zest, what higher pride, what nobler self-respect, will he labor if to save mankind from the ravages of disease! Instead of looking with satisfaction upon his daily list of ten, twenty, forty, sallow, haggard, crippled wretches, it will become his boast that in the community in which he lives there have been the fewest sick, the smallest death-rate, the rosiest children, the happiest parents, the most hale and hearty octogenarians. It has been reputed against the medical officers of the corps to which I belong that they can know but little about disease, since they live chiefly among healthy men; and I fear the longer their service, the farther they are believed to be removed from acquaintance with the ills that afflict the body. This may be so, but I do not envy my civilian colleague, whose years have been passed amid scenes of suffering and bodily misery, more than half of which he knows to have been unnecessary and preventable; nor do I covet his wealth, so much of which has been wrung from hearts that have needlessly ached.

Fifty-two deaths in thirty-five years, five of these from accident, less than two, annually, per thousand of population, have been the result of careful sanitation on the station to which I am now attached, and this in spite of insalubrious climatic conditions; but there are here no fetid sewers, no piles of rotting dirt, no dark and murky dwellings, with foul cellars and festering alley-ways, between crowded blocks of buildings. There is no stint of wholesome food and pure water and bright sunshine. There are broad green lawns, where round-limbed children are cradled in the open air beneath the trees, or over which they romp without fear of their dread enemies, scarlet fever, measles, and diphtheria. During twelve years but one died. Here come every year a hundred or two of slender striplings, who have been injudiciously pampered by doting parents, or pale lads, who have, through adverse fortune, lacked all these others had in excess, and who, having slowly added a pound or two to their yearly weight, here, under the influence of a regular regimen, hardy exercise, out-door exposure, and judicious mental employment, are transformed into ruddy youths, striding towards vigorous manhood at ten-fold their former pace. Forty or fifty of such robust young men annually go forth, to return in two years, more than three fourths,[1] scarred like veterans with venereal wounds, not all with syphilis, — though I have seen five cases of its virulent form in a single class, — the majority with gonorrhœa, that undreaded accident, which leaves the stamp of a rheumatic diathesis on some, tortures others with unsuspected stricture and prostatitis in their after-years, and is the father of so much of the uterine disease which afflicts the women they have made their wives.

Those who attended the last meeting of the American Medical Association, at Atlanta, must have remarked the unusual prominence given to preventive medicine in the deliberations of that body. The presence of so many of the members of this Association and of the National Board of Health, as well as the general dread of the anticipated epidemic, had much to do with this, but it is no less gratifying that the medical profession is beginning to recognize and avow that its highest and noblest mission is to prevent disease. Just as the surgeon to-day uses the knife, when all else has failed, and he is powerless to save, when the meddlesome man midwife has sunk to the level of the old-time charlatan, who looked at tongue and pulse, and asked about the bowels as a prelude to his routine dose, so will the intelligent physician, in the future, sadly have recourse to his scanty pharmacopœia only when he has not succeeded in keeping his charges well. There can never be too many sanitary doctors in the land, and as they multiply the dust will settle on the prescribers' unused bottles, the mold cover their untouched contents; but it is folly to exterminate only diphtheria and small-pox, and scarlet fever and typhus, and let syphilis, the most prolific mother of evil of them all, send forth her brood of whelps to be "the cause of more bodily and mental misery than all other shapes of human error combined."

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[1] I would not be understood as implying that these young men are worse or more unfortunate than others of their profession, or in civil life. Since the reading of this paper, I have been told by a young lieutenant that only a single member of his class escaped; and there is no reason why lads of any station in town or country should go scathless. What their fathers scrupulously conceal their associates will explain. The omitted Odes of Horace and the skipped chapters of the Bible are those most carefully scanned without a teacher, and the good boy, who has devoutly believed his parents' assurance that babies are dropped from the skies, or imported from China, or born on magical trees, will, when the revulsion of the truth comes upon him, be the most apt to devour the fruit of the tree of knowledge, — core and all.

VIII.

ON ROTTING WOOD.

READ AT THE SEVENTH ANNUAL MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION, NASHVILLE, TENN., NOVEMBER 19, 1879.

By PROFESSOR WM. H. BREWER,
Of Yale College, and President of the Board of Health of the City of New Haven.

For some time I have been carrying on a series of experiments on the physical characters of American woods. Incidental to this work, some facts have impressed me so strongly that I think it well to bring them before this Association, even though the facts be not entirely new to science. The aim of the experiments is, a quantitative determination of the hygroscopic characters of certain woods, the amount of sap contained in green wood at different seasons of the year, the relative amount of soluble matter in green and in seasoned woods, etc.

It is well known that all woods contain nitrogenous compounds, known chemically under the general name of *albuminoids*, and that these substances are active in inducing decay. All chemical methods for the preservation of timber from rot, look towards getting the *albuminoids* in some less soluble condition or some chemical combination less liable to decomposition. When green wood is well soaked in cold water, much of this albuminoid matter is dissolved out, and the solution is very putrescible, more so indeed than any person present would deem possible without having tried the experiment (and it is an experiment I would advise you to make). The fact is as true of the hardest woods, as maple and locust, as it is of soft woods like magnolia.

To illustrate: if a few pieces of such green wood, say of locust (which I cite because it is a hard and particularly durable species), be carefully freed from bark and all foreign dirt and put into pure cold water, even distilled water, and let stand at the ordinary temperature of our rooms (but better at 75° or 80° Fahr.), the water soon begins to become turbid and opalescent; this opalescence increases, in a few days, more or less according to the temperature, a pellicle forms on the surface, thin at first, but with some species it soon becomes thick and gelatinous, active putrefaction goes on, accompanied with an abundant growth of the septic ferments, and the liquid in due time becomes peculiarly and pungently stinking.

Without any visible evolution of gas, the liquid soon becomes very offensive to the smell, even when very diluted. The odor naturally varies with the species of wood used, but with most kinds I have tried, it is very rank, I think fully as much so as the same amount of *animal* matter would produce. The intensity and rapidity of the putrescence varies, of course, with the temperature, the kind of wood, the degree of concentration of the solution, and with the amount of tannin and other extractive matters having antiseptic characters.

As in the case of other putrefactions, we do not know what the gases are which produce the smell; it is probable that they are organic compounds of simpler molecular constitution than the albuminoids ; and it is also probable that, as in other odors, the absolute amount exhaled is very small in comparison with the result produced on the senses.

No chemical examination has been made of the ultimate products. If kept long enough and of sufficient concentration, there is an abundant fungoid growth in the solution. If kept in the light it usually grows darker in color, gradually becomes sour to the taste and the smell, but continues offensive in odor, I know not for how long, but in bottles partly filled and stoppered, in some cases it continues to smell badly for one or two years. Regarding the duration of the odor, the color of the solution, and the character of the liquid after the first few weeks, my experiments are very incomplete. Where the solution is kept in the dark, the odor seems more offensive than where the putrefaction goes on in the light ; but in this direction also, my experiments are neither numerous nor complete.

In the free air and in full or partial sunlight (and this is the condition to which piles, and the vegetable matter in swamps are subjected), a white fungous growth takes place, on the surface of the wood, which becomes slimy as it increases. This growth is more abundant on the ends of the grain of the wood than on either the radial or tangential sides. If the solution is poured from the wood and kept in a separate vessel, the fungous growth continues, and the offensive smell goes on until the decay is complete ; how long this may be I do not know.

If the wood be placed in successive portions of clean water, the soluble matter continues to be extracted for several months, even from small blocks, the tendency to putrefaction grows less and less, and finally ceases only when the total amount of water used in the successive washings has been enormous, compared with that of the wood. Finally, however, the soluble matter appears to be removed, the water then remains clear, and the wood ceases to be covered with the slimy fungus, at least to any considerable extent.

It has long been known that timber which has been thoroughly water-seasoned, is very durable, and it is probable that this is solely because of the removal of the soluble and putrescible albuminoids.

Experiments tried with some of the same woods in sea-water and in brackish water (made by mixing two measures of fresh with one of sea water) show similar results. The turbidity begins sooner in sea water than in fresh, the opalescence is denser, the film on the surface becomes thicker, and the smell is more disgusting, and sulphureted hydrogen is perceptible. One also recognizes the characteristic " blue mud " smell, so well known in many of our harbors, and about our wharves. The number of experiments with salt water is, however, much less than with fresh water.

Heart-wood and sap-wood act essentially alike in this matter; the difference is one of degree rather than of character.

The suggestiveness of these experiments is too obvious to need much comment here, and yet I will add a word more. If piles about our wharves and similar structures in water, do not smell so badly, it is merely because that the solution is so much more diluted. The decay, however, goes on just the same, or even more rapidly, for it is well known that dilution of albuminous substances hastens their decomposition. The vegetable matter decaying in swamps where the relative amount of water is less, often shows the results more evidently. In the decay of sawdust and other vegetable matter under the still water of ponds, there is a more obvious evolution of gases, notably of light carbureted hydrogen, and because it is easier seen, and its presence proved by chemical analysis, malarial trouble has been attributed to it. But, as I stated in a paper read at a previous meeting of this Association, I do not believe that those permanent gases, nitrogen, carbonic acid and light carbureted hydrogen are the really injurious exhalations from swamps; they are the most obvious ones, and hence they have been accused of the mischief. Whether the unwholesome effects of the exhalations from swamps, and decaying vegetables in water, are due mostly to the organic gases which accompany putridity, or in organisms which develop under these conditions, remains yet to be proved. I have proved that the solutions of wood produce septic ferment organisms in great abundance, even when the solution is very diluted, and each succeeding year brings more knowledge of an intimate connection between disease and the septic ferments, or organisms which belong to that class.

The exhalations of swamps and from vegetable matter decaying in still and shallow water, are universally regarded as unwholesome to men of our race in climates as warm as ours is in summer. The experience of our race from the earliest ages, and in all parts of the world, has created this belief, and hence I deem it unnecessary to argue the sanitary bearings of the experiments I have described.

IX.

THE ACTION OF VEGETABLE ACIDS ON TIN.

PRESENTED AT THE SEVENTH ANNUAL MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION, NASHVILLE, TENN., NOVEMBER 21, 1879.

By Prof. CHARLES E. MUNROE,

U. S. Naval Academy.

It has for some time been known that, under certain circumstances, tin, which is regarded as one of the most permanent of the common metals, is corroded by cold water. In the "American Chemist," W. J. Rolfe[1] cites an instance of a tin-lined lead pipe used for conveying well-water, which had been corroded badly upon its tinned surface after a few months' use. S. P. Sharples,[2] in the same journal, gives a detailed account of a singular case of the corrosion of a tin tank, used as a storage reservoir for water, in Collinsville, Conn. This tank was of block tin, containing only two per cent. of impurities. The water with which it was filled was a good spring water. It was led into the tank and carried away by a lead pipe. After five years' use the tank was so badly corroded as to be useless, and it was covered with a white coating. The coating was found to consist of oxide of tin, with a trace of iron. The water was free from nitrates, and contained from .80 parts to 2.5 parts of organic matter in 100,000. At the meeting of the American Association for the Advancement of Science, in August last, Mr. J. W. Osborne exhibited a piece of block-tin pipe which had been used in his water-filter. The filter was built up with layers of clean sea-sand and charcoal, and where the pipe entered this filter, it was corroded. He asked for an explanation of this phenomenon, but none was given, nor has the action been explained in any of the cases cited. All experiments heretofore made seemed to show that water was without action upon tin, and that these case were abnormal. Professor Chandler,[3] in an article on the use of tin-lined lead pipe, says: "Waters which take up one to two tenths of a grain of lead per gallon from lead pipe are not perceptibly affected by remaining for considerable lengths of time in the tin-lined pipes." Mr. Cassamajor[4] states that tin is slightly more electro-negative than lead, and that it at first starts a feeble electric current which serves to cover the lead with a coating of oxide, and then all action ceases. Dr. Lankester[5] states, in regard to the tin-lined pipes: "I have tested these pipes with great care, and have exposed them to the action of water of various kinds. In no case have I discovered in the water the slightest trace of lead or tin. I have submitted the pipes to the action of distilled water, of Thames water, water from artesian wells in London, and to water highly charged with organic matter ; and in no case, where these waters have been exposed to the usual reagents for detecting the presence of tin or lead, has the slightest quantity of these metals been detected."

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[1] Vol. i., p. 391.
[2] Vol. iv., p. 250.
[3] *Am. Chem.*, vol. ii., p. 282.
[4] *Am. Chem.*, vol. i., p. 3.
[5] *Am. Chem.*, vol. ii., p. 27.

Field[1] states that tin does not oxidize at ordinary temperatures in the air, and but slightly in water, retaining its metallic lustre for a long time; and, again, it is not affected sensibly by the combined action of air and moisture. Such cases of corrosion of tin as are given above must then be due to unusual conditions. The results of the experiments which follow give, I believe, a probable explanation of the cause of this action of the water.

In 1872, in an article upon the Adulterations and Impurities of Food, in the report of the "Massachusetts State Board of Health," Prof. H. B. Hill[2] called attention to the action of acid fruits upon tin cans. He pointed out the fact that when a fruit-can is opened, and its inner surface examined, it will be found to be covered with the crystalline figures often produced by the action of dilute acids upon tin, and known as the *moirée métallique.* This apparent corrosion of the metallic surface suggested the possibility that an acid fruit, if kept for a sufficient time in such a can, might take into solution an injurious quantity of metallic impurity. Moreover, it was thought that by the action of these acids upon particles of solder which had accidentally got into the can the fruit might become contaminated with the lead which entered into the composition of the solder, to the extent of from thirty to sixty per cent. As a result of his examination of five cans of tomatoes, he found in every case tin, lead, and copper, present. One can of peaches tested gave the same result. Attempts were made to determine the substances quantitatively, but the quantities were so minute that accurate separation and determination could not well be effected. The copper and lead were present only in traces ; the tin, however, was present in larger quantities.

In 1874, I was called upon to examine a more extensive case of corrosion of tin by fruit acids than those investigated by Hill. The circumstances were as follows : A gentleman conceived the plan of serving cider from fountains, as soda-water is served. So he put his cider into a tin-lined copper fountain, and charged it with carbon dioxide. When first tested, the cider was forced out, filled with gas, furnishing a pleasant, effervescent drink ; but, after some time, and before the cider was half drawn, the fountain ceased to act, and when the cider was poured from the fountain, it was found to be flat and insipid, and to possess a decided metallic taste. It was at this point that the cider was brought to me in order that I might discover the cause of the change it had undergone.

The liquid had the smell of fresh cider ; it gave an acid reaction ; it was filled with yellowish-brown, flocculent matter, suspended in it. The liquid was filtered, and, on heating, it gave a brownish-black sediment. On being again filtered, the clear filtrate gave a copious chocolate-brown precipitate with dihydric sulphide, which was completely soluble in yellow ammonic sulphide, and gave the tests for tin. The sediment, when heated on platinum foil, gave off organic fumes, and left a residue which was found to be tin oxide. In the salt of phosphorus bead, a trace of iron was discovered. Two portions of the original filtered solution of one hundred cubic centimeters, each, were taken for analysis, and they gave respectively, —

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[1] Watts's *Dict. Chem.*, vol. v., p. 803.

[2] *Report*, 1872, p. 132.

1. .0215 grams stannic oxide.
2. .0222 " " "

Mean, .0219 " " "

which corresponds to .2190 grams of stannic oxide, or .1720 grams of metallic tin, or .2759 grams of stannous chloride per liter of clear cider. This is also equivalent to 12.78 grains of stannic oxide per United States gallon.

In 1877, my attention being again called to this subject, I arranged some experiments to test the action of fruit acids upon tin. In these test-tubes I placed dilute solutions of acetic, citric, and malic acids, and, dropping a few pieces of tin in each, corked them tightly, and put them away. Into three similar tubes I put similar solutions, and, after passing carbonic acid through them for some time, I dropped bits of tin in them, closed them with corks, and placed them beside the others. Not having time to attend to them sooner, I let them remain until a week ago, when I examined them, and found that in every case the tin had been attacked. At the bottom of each tube there was a white precipitate. After washing, this gave off slight organic fumes, due evidently to a small amount of the organic acid which had not been washed out. The remainder gave a reaction for oxide of tin. The amount of residue varied in the different tubes, being greatest in the tubes containing acetic acid, and least in those containing malic acid. The clear filtered liquid gave a precipitate with dihydric sulphide, which was completely soluble in yellow ammonic sulphide. The clear solution gave also, with mercuric chloride, the reaction for the stannous salts. The precipitate was heaviest in the malic acid solutions, and least in the acetic acid solutions. The precipitate was heavier in those solutions which contained carbon dioxide than in those which contained none. These results lead me to conclude that each of these acids act upon metallic tin; that they act more vigorously upon it in the presence of carbon dioxide; that the malic acts more readily than the citric, and the citric than the acetic, and that the acetic salt is the most readily decomposed, and hence gave the largest residue. All of the solutions were found to be acid.

I determined now to extend my investigation to the action of all the acids of our common fruits upon tin, when heated, the previous experiments having been done in the cold. I took malic acid, the acid of the apple, peach, and tomato; citric acid, found in lemons; tartaric acid, occurring in grapes; oxalic acid, which exists in the rhubarb and sorrel; and acetic acid, which is the product of the fermentation of sugar, and heated them with tin. In every case, although the original acid gave no trace of tin, the liquid boiled with the tin gave a decided precipitate both with dihydric sulphide and mercuric chloride. The energy of the action seemed to be in this order: Oxalic, malic, tartaric, citric, and acetic, the last giving only a faint precipitate. Watts [1] says boiling acetic acid dissolves tin slowly with the evolution of hydrogen.

When I examined the tin left in the solutions for over two years, I found that it remained bright in all cases except where citric acid had been employed. The tin in these had become coated with a dark-blue, metallic-looking precipitate which I determined to be lead. This led me to examine the action of these organic acids upon lead. They were each boiled with lead. The malic, citric, and oxalic acids did not act upon the lead. The tartaric acid gave a reaction for lead with potassic chromate ; the acetic acid gave a marked reaction by the same test for lead. Having observed that the tartaric acid apparently acted on tin more readily than upon lead, it occurred to me that perhaps the tin would replace the lead in its solution. On boiling a tartaric acid solution containing lead, with tin, I found that the solution no longer gave a reaction for lead. The acetic acid solution containing lead was then treated with tin, and boiled for a considerable time, but without effect, showing that the acetic acid acted more on lead than on tin. It is hardly necessary to observe that in all cases the acids used were tested for lead before they were employed. It now remained to account for the lead in the citric acid solutions which had been kept for two years. There were two samples of citric acid at hand : one consisting of bright, clean-looking crystals, recently obtained from Bullock & Crenshaw ; the other consisting of part crystals and part powder, which had been in stock for some years, and which had a slightly dirty appearance. It was the second which was used in the first experiments. On dissolving and testing, this gave a slight reaction for lead. The new acid was free from lead. We may account for the presence of lead in citric acid from the way in which it is prepared.[2] The raw lemon-juice is treated first with chalk and then with quicklime, to convert it into a calcium salt. The calcium salt is then decomposed with sulphuric acid, the gypsum formed filtered off, and the liquid boiled down in a leaden vessel until a film forms on the surface, when it is allowed to cool and crystallize. If the evaporation is carried further, the acid will be charred by the free sulphuric acid present. We can see from this that there are several possible sources of lead contamination. It may already exist in the sulphuric acid added, or it may be taken into solution by other substances present in the lemon-juice, or perhaps the concentrated acid acts on the lead while the dilute does not, or the citric acid may dissolve lead salts while it will not attack the metallic lead.

These results show that when acetic acid is absent, although tin is dissolved by the fruit acid, yet any lead that is present is precipitated, and thus our tin culinary utensils may have prevented some lead from going into our food. When, however, the fruit has undergone acetic fermentation, it will then act more readily on lead than on tin.

On examining some cases in which tomatoes and peaches had been preserved, I observed the *moirée métallique* which Professor Hill [3] had pointed out, but I also remarked a dark-blue streak about the bottom of the can, which suggested lead. I first placed dilute nitric acid in the can, and heated it, when a vigorous reaction took place. The cooled, clear solution gave a heavy precipitate with potassic chromate. Fearing that this might in some way be due to tin, I treated pure tin with the same acid, and got a similar precipitate. Recurring now to my observations, cited above, that acetic acid acts on lead more readily than on tin, I repeated the experiment with dilute acetic acid, and got a slight reaction, with potassic chromate for lead.

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[1] Watts's *Dict. Chem.*, vol. i., p. 18.

[2] Watts's *Dict. Chem.*, vol. i., p. 994.

[3] *Report of Mass. State Board of Health*, 1872, p. 132.

Experiments similar to this last were made by M. Fordos.[1] He examined various alloys of tin and lead, used for culinary purposes and drinking-vessels, containing generally about ten per cent. of lead. He introduced into tin pots, used by pharmacists, water acidulated with one per cent. of crystallized acetic acid. After some days the vessels were covered with a light, white deposit, soluble in acidulated water, and giving the reactions for lead. Red wine was placed in two tin goblets, one new, the other old. After twenty-four hours, both gave an appreciable amount of lead. He found also that tartaric lemonade, after standing twenty-four hours in one of these tin pots, contained lead. He concludes that wine, vinegar, and lemonade dissolve the lead out from alloys with tin, together with a portion of the tin. W. H. Dougherty[2] has found that when citric acid, or fruits containing vegetable acids, are boiled in enameled iron pots, when the enamel contains lead, the lead is dissolved. M. Fordos's experiment with the tartaric acid, in the presence of both tin and lead, does not confirm my results, but it may have been that the lemonade contained acetic acid formed by fermentation. Mr. Dougherty's experiments with citric acid differ from mine in the fact that he employed a salt of lead, while I used metallic lead.

It will be observed that Hill[3] also found lead in the presence of tin where acid malates were present; but this may have been due to the fact that minute particles of solder were mixed mechanically with the large masses of thick liquids which he treated, or there may have been a slight amount of acetic acid present.

Let us now return to the cases of the action of water on tin, cited above, and consider them in the light of these experiments. We have seen that the organic acids used act upon tin. Is it probable that this action is confined to these acids only? May it not be that the waters used contained some organic acids that possessed a like property? Sharples[4] proved that nitrates were absent, but organic matter was present, in the water he examined. It is true that Dr. Lankester found that water highly charged with organic matter did not act upon tin pipes, but the nature of the organic substance he used is not stated in the article referred to, and it may have been free from organic acids. Hence I venture the opinion that humic acid, or some similar acid, may corrode the tin; and, in case a like phenomenon is observed, I would suggest examining the water for the presence of such acid. In the case of Mr. Osborne's pipe, the acid may have come from partially burned charcoal.

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[1] *Compte Rendus*, lxxix., p. 678.

[2] Phil. Acad. Sc.

[3] *Report Mass. Board of Health*, 1872, p. 132.

[4] *American Chemist*, vol. iv., p. 250.

At the Saratoga meeting, it was suggested that the corrosion of this pipe might be due to the disintegration of the tin. Dr. I. Walz[1] and Dr. Fritzsche[2] have shown that through the action of time or by extremes of temperature, tin is disintegrated and crumbles to dust, and from an examination of this dust Rammelsburg[3] was led to the conclusion that tin was dimorphic. It may be that in this condition the tin is more readily acted upon by solvents.

Much is said about, but there is little definitely known of, the poisonous effects of tin. Dr. Alston[4] gave one ounce of metallic tin (*Stanni pulvis*) on an empty stomach, following it, for two successive days, with a half ounce each day. The prescribed dose is a half ounce in molasses. The tin should be free from oxide. Dr. Chandler[5] says, "that tin is harmless, it is hardly necessary to argue, as vessels covered with this metal are extensively used for culinary purposes throughout the civilized world." The "Jour. de Pharmacie"[6] reports a case in which death is supposed to be caused by tin. Pereira[7] states that tin has no influence on the body. It appears, however, that acid, fatty, saline, and even albuminous substances, may occasion colic and vomiting by having remained for some time in tin vessels. Oxide of tin is poisonous, according to Orfila; but Schubarth found it inactive. The stannous chloride and stannic sulphide have been used in medicine. The chloride acts topically as an astringent, irritant, and caustic. It is administered internally in doses of from one sixteenth to one half grain twice or thrice a day. When taken as a poison, it sometimes causes paralysis. Tanner[8] says death from the use of the chloride of tin is rare. The action of the tin salts certainly demands investigation.[9]

In conclusion, I beg to state that I regard my investigations as by no means complete, and I point out many conditions which need further investigation and study; but my professional work leads me in a different direction, and I have been able to give but a short time to this, and must drop it here. If, however, it may induce others to take up the investigation, I shall feel that it was worth the while to put these observations on record.

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[1] *Jour. Frank. Inst.*, lxiv., p. 301.

[2] *Revue Hebdom. de Chimie*, 1872.

[3] *Barieth. Dental. Chem. Grull.*, No. 10, 1870.

[4] *U. S. Dispensatory*, 14th ed., p. 1777.

[5] *Am. Chem.*, vol. ii., p. 282.

[6] 4e Sera, xix., 1878.

[7] 1852, p. 689.

[8] *Mem. of Poisons*, 1875, p. 56.

[9] "The author has recently met with instances of this action (corrosion) in the case of preserved fruits, and the like, put up in ordinary tinned canisters; an unpleasant metallic taste was noticeable, and on analysis, considerable amounts of *tin* were detected in solution in the juice, besides iron from the underlying metal of the tin plate; in one case, violent colic and diarrhœa, lasting for several hours, was produced in the persons partaking of the preserved fruits; this corrosive action on tin has only been noticed as yet in the case of very *acid* fruits, etc., such as apples and rhubarb." — C. Alder-Wright, *Notes on Metals*, p. 185.

X.

POST MORTEM EXAMINATIONS IN RELATION TO PUBLIC HEALTH.

PRESENTED AT THE SEVENTH ANNUAL MEETING, NASHVILLE, TENN., NOVEMBER 21, 1879.

By EDWARD G. JANEWAY, M. D.,
Health Commissioner, New York City.

THE aim of this article will be to show the value of post mortem examinations to sanitary science. It has seemed to me that the results to be obtained by a careful examination of the dead body have been too little appreciated in relation to this subject. In consequence, popular prejudice and superstition have been permitted to thrust this important aid too far into the background. My desire will be accomplished, if I shall in any whit raise the estimation in which this procedure is held, and dispel, in however small a degree, the objections which are entertained toward the examination. Let us first glance at the advantages to be obtained by autopsies, considered with reference to the aid they afford the sanitarian.

1. A post mortem examination, by means of which the nature of a morbid process, doubtful during the lifetime of a patient, but of possible infectious character, is established, will demonstrate the necessity for, or the needlessness of, measures intended to prevent the spread of diseases.
2. An autopsy, by showing that a dreaded disease reported as existing had been simulated by another not contagious, would prevent alarm and mercantile injury.
3. Many of the evil effects of certain infectious diseases may be averted by the early acquisition of the knowledge of their existence, for which, as stated under the first head, an autopsy may be necessary.
4. More correct statistical information will be obtained by carefully conducted autopsies.
5. This information will result in greater knowledge of the different morbid processes, and will lead to a better understanding of their etiology.
6. A lessened mortality will occur when it is known that the diagnosis and treatment will, in every case, be subjected to criticism following a thorough post mortem examination.
7. An autopsy in every case of death would be one of the best means of combatting quackery within or without the ranks of diplomatized physicians.
8. Carefully conducted post mortem examinations, aided by experimental pathology, will increase our knowledge of the etiology of disease; and the advantages claimed under the third head be increased thereby.

In the remainder of this paper I shall not strive to consider the value of each of these propositions, but shall in the main draw from my experience to support the first three statements. I shall claim, that when in any locality a death has happened to a person who has been supposed to be sick with an anomalous type of a contagious or infectious disease, an autopsy should be performed, and especially if no such disease is prevailing in the vicinity. A mistake in the diagnosis in such a case may prove a serious injury to a neighborhood in a pecuniary as well as in a vital sense. In order to consider this matter in its true light we must see what mistakes are likely to occur, and to a certain extent in how far it may be possible to avoid them. I will first allude to the possibility of confounding typhus, typhoid, and remittent fevers with one another, and with miliary tuberculosis.

Let us for illustration suppose that at some summer hotel entertaining a large number of guests such an event has occurred, as the death of one of the inmates from what had been considered one of these diseases. No comment of mine is needed to bring out the interest, pecuniary on the part of the proprietor, and vital on that of the guests. Each has too much at stake not to need full information of what has happened. The act of the ostrich, in burying its head in the sand in order to escape its pursuers, is no more foolish than that of those who, under the circumstances mentioned, bury the body of the first victim without a thorough examination.

For, if tuberculosis have been the cause of death, no alarm need be entertained on the part of the proprietor, nor does any reason exist why the guests should desert such a place; nor is there the necessity for the disinfection, repairs, and overhauling which are occasioned by the occurrence of typhoid fever. We can also appreciate the damaging nature of the assertion that Mr. Blank died at such a summer hotel of remittent fever. If the disease were typhoid when supposed to have been remittent, and *vice versa*, entirely different measures would be necessary to protect the neighborhood, and the investigation of causes would be conducted in different situations. In the case of typhoid fever the examination would extend to the drinking water, as regards pollution, and to the pipes and other receptacles, for sewage. An investigation of the milk should also be entered into. Moreover, in the case of typhoid fever all cesspools, pipes, etc., should be emptied, cleaned, and disinfected. In the case of remittent fever, on the other hand, this procedure would be to a great extent unnecessary, but the character of the soil, its drainage, the amount of vegetable decomposition, and the nature of the surrounding country for one or more miles as to ponds, water courses, etc., should be made the subject of earnest inquiry; and any faults detected should be immediately corrected. A tree and hedge protection could be started to prevent the poison being wafted by the wind from a distant source. That, which it is wise for the proprietor of the summer hotel to do, is still more imperative for the inhabitants of cities and of country villages; since a constant instead of a temporary exposure to any baneful influences affects them. Yet the whole argument is founded upon the premise that the disease was a typhoid or a remittent fever. My experience teaches me that these diseases have been supposed to exist during the illness of a patient by good observers, but that the post mortem examination has shown, instead thereof, a miliary tuberculosis. This is in fact no uncommon mistake. But it is, by no means, the only one that I have observed. Typhoid, typhus, and remittent fevers are mistaken for one another. The most common error is the confounding of typhus and typhoid fevers. One cause for this exists in the retention by the German physicians of the name typhus for both processes, exanthematicus for the proper typhus, and abdominalis for typhoid. Were these designations always used there would be no confusion, but not infrequently the qualifying adjective is omitted, and the death reported as typhus. On the other hand, it was to our knowledge very common to mistake these diseases during the epidemic of typhus in 1864–66, in New York city. At the present time, and since 1870, certainly, the greater part, if not the whole, of what has been recorded under the head of typhus fever should be grouped under the head of typhoid. For any one who collects statistics and generalizes from them, this becomes a serious source of error. Moreover, the measures to be adopted with reference to the prevention of these diseases are in a great measure different, and the investigation of causes must proceed in a different direction. So that it is a matter of vital interest to a sanitary officer to know whether a disease is typhus or typhoid. If typhus fever, as far as the large cities of this country are concerned, it will, with perhaps one exception, have come from an exotic source. The exception consists in the origin from defective ventilation, over-crowding, and accumulation of filth on the person of inmates in jails, charitable institutions, and houses, when conjoined more especially with insufficient nutrition, causes to which Murchison has especially drawn attention. The experience which I have had in New York leads me to believe in the production of this disease almost exclusively by contagion. (The exception being that above mentioned.) Were a true case to be encountered a sanitary officer should examine the residence of the victim with reference to the above mentioned particulars, and be especially careful to determine whether it may not have arisen from contagion introduced by an emigrant, or a person having contracted the disease from an emigrant. We have already alluded to the direction of the investigation in the case of typhoid fever. Now to show the possibility of this mistake the writer will mention one of a number of errors of this kind of which he has knowledge. An epidemic occurred in a school in the neighborhood of New York in 1867. Some fifty children sickened. The disease was pronounced by certain physicians who saw the cases malignant typhus, so recorded in the papers, to the alarm of the neighborhood and the great injury of the school. A controversy as to the nature of the complaint arose, though the symptoms were unmistakably those of typhoid fever. After a while, on the death of one of the victims, an autopsy silenced all contention in proving incontestably the typhoid nature of the complaint.

Again, quite a number of complaints are at times supposed to be malarial fever, owing to the symptoms assuming a periodical type. And at the present time, when the term malaria has become so popular, and every little ailment and distress is so denominated, it is wise to see in how far observation has shown the liability to err in this direction. Some years since I made an examination on the body of a young lady who had been supposed to have had malarial trouble for years, and had been sick with an acute disease, periodical in its manifestation, which had been called remittent fever by the physicians first in attendance. The autopsy showed that death and the symptoms had been due to an obstruction at the lower end of the ileum, owing to a thickening of the peritoneum covering this portion. This had shortened, and, in consequence, had drawn this portion of intestine into folds, as a purse or drawer string would do. Above the obstruction the intestine was dilated and inflamed. The death was evidently due to the obstruction primarily, and secondly to the enteritis which it occasioned. There was no evidence on the part of the liver or spleen that this young lady had ever had malarial fever. This is of course an extreme and rare case, but I have met another in which gastro-enteritis was mistaken for malarial fever. A much more frequent error is to consider internal suppuration, such as occurs in empyema, Potts disease, pyæmia from middle ear trouble, or from some hidden source, idiopathic liver abscess, acute interstitial nephritis, pyonephrosis, perinephritis and perityphlitis, etc., malarial or a typhoid fever, much more frequently the former than the latter; at times the mistake is discovered before death, but not so very infrequently after death. Amongst the diseases named it is especially those which do not produce manifest tumor which are most often mistaken. Even pneumonia may at times be considered as a malarial fever, though the error is more likely to obtain in children than in adults, and is more likely to be encountered clinically than on the post mortem table. It is in those cases in which the pneumonia begins in the centre of the lung, or in some spot difficult of reaching in auscultation, that the mistake is prone to happen.

Trichinosis, the disease due to trichinæ, is not so rare an affection as is generally believed. From the nature of the symptoms it is apt to be mistaken for typhoid or remittent fever. I have met a large number of bodies in whose muscles old encapsulated trichinæ were present, sometimes in very great numbers, or, again, so sparse that only three or four could be seen by careful inspection in the pectoralis major muscle. The disease, too, is one which, as far as my observation goes, is very little likely to happen in other than the German portion of our population. The cause for this distinction of race lies in the difference of habit obtaining in the different nationalities about the cooking of ham, sausages, etc. The German more frequently eats the uncooked, or even raw, article, whilst the others cook thoroughly before eating. I have observed a marked diminution in the number of bodies containing this parasite within the last two years, and I have no doubt that the disease is becoming more infrequent since public attention has been so markedly called to its cause and the method of preventing it. The disease may even be overlooked at the post mortem table.

As the worm only begins to wander after the eighth day from the time that the meat was swallowed, it is possible that portions of muscles should be examined as late as the fourteenth day without detecting it. At this early period a microscopic examination of intestinal mucus should be made. A microscopic examination of the muscle is necessary until the capsules are formed, which, especially if calcified, bring the disease to naked eye observation. If I may be pardoned for a digression, I will allude to a mistake likely to happen to those who believe that harpooning a portion of the muscle will decide as to the presence or absence of this disease. It must be performed at a sufficiently late period, probably not before the beginning of the third week, and in an individual whose muscles are sufficiently thickly studded with the young brood. If we obtain the young worm it is of course conclusive, but if we fail, it is no proof that the disease is not present, only that we have not been able to obtain positive evidence. I am not aware that any one has thus obtained the worm in a calcified capsule, but conceive that it might happen, and an error arise in this way of supposing that this was indicative of a recent disease.

The post mortem examination is of especial value in deciding whether a death has been due to malarial or yellow fever. Already the attention of the members of the Association has been called to the advantage of this evidence in such cases in papers presented at a previous meeting. It is particularly in those cases which are considered malarial by some, yellow fever by others, and in those cases of fever occurring in a situation and under conditions which might allow of the development of either of these diseases, that the examination should be made as a public duty. The possibility of a mistake in diagnosis between these maladies from depending entirely upon clinical data is furnished us each year by the daily newspapers and the medical journals. I have frequently noticed that at the beginning of an outbreak of yellow fever this is considered, and telegraphed to the country as bilious remittent. It has not been so very infrequent an occurrence that we have been treated to the opposed views of medical men about the same case or group of cases. Moreover, a doubt still exists about the nature of the malady in some of the fatal cases, owing to the absence of a post mortem examination; cases, too, which would have proved of considerable value if no doubt obtained. The difference in the anatomical features of the two maladies is without doubt sufficiently known to the members of this Association, — the small spleen and the yellowish liver, more or less fatty, of yellow fever, and the large, softened, and pigmented spleen, and often bronze liver of remittent fever serve to distinguish these complaints. When the pigmentation is moderate a microscopic examination is desirable. I shall simply draw attention to certain sources of error in coming to a decision in this matter. One is especially apt to occur in hot climates, and in the bodies of those dying of an acute disease. This is the staining of the organs by the action of the sulphureted hydrogen of the intestinal tract upon the iron of the blood. It gives rise to a greenish-black discoloration, which I have known to be taken for that due to malarial pigmentation. There are, however, certain precautions which will enable the observer to meet this difficulty. In the first place, such discoloration, from post mortem change, is usually superficial, and frequently limited to those portions of the organs mentioned, which lie in propinquity to the intestines, the rest of the organ having the normal red or brown color, or that which has been produced by the changes effected by disease. Again, the color in the pigmentation of disease, and that due to malarial fever, are different. In the former it is a greenish or greenish-black ; in the latter a slate-gray to a chocolate-brown or brownish-black. It seems to me that one, who has for the first time noted the difference, will never after make the mistake.

The other danger, whose full importance I am unable to estimate from want of data, relates to the occurrence of yellow fever in a person who had previously been affected with a pigmented liver and spleen due to malaria. In any such case it seems probable that the history of a previous attack not long preceding the fatal one would aid to prevent a possible error. It has seemed possible to me that during an epidemic of yellow fever cases of a malarial type would occur and be perhaps mistaken for the former disease ; and that if another epidemic should affect the same place within a few years, and these persons become victims to the yellow fever, or if the reverse should obtain, would be considered as illustrations of a second occurrence of yellow fever in the same person. All these so-called second attacks should be subjected to the closest scrutiny, and, in case of death, should, in my opinion, lead to a careful investigation of the body. The country has a need to know how frequently this disease is likely to occur.

I have had opportunity to verify on several occasions the advantages claimed for post mortem examinations under the second head, in addition to that relating to malarial fever. It may be a matter of interest to the members to know that diseases have been thus mistaken ; though it should be added that the clinical history of these cases, the locality of the patient's dwelling, and the absence of exposure to the yellow fever poison were sufficient to guard against the mistake. The occurrence of jaundice in the summer season gives occasion for the dread that it may betoken yellow fever ; and it is right that if any suspicion exists the matter should be subjected to the fullest investigation. Several years ago I made a post mortem examination on the body of a woman who was reported to have died of yellow fever, and to have had deep jaundice for three weeks. The autopsy disclosed acute yellow atrophy of the liver. If you will recall the symptoms of this disease, the hemorrhages, the black vomit, and the deep jaundice, they will serve to explain the mistake which the ante-mortem observer made. The disease is infrequent, and I should be glad to know if this mistake has been observed in cities where yellow fever prevails.

Another person, a man, having slight catarrhal jaundice, had died suddenly. The post mortem examination showed marked fatty degeneration of the heart fibres as a cause for death, and a slight catarrh of the bile ducts.

A third case was one of jaundice in a man whose gall-bladder was filled with gall stones, and the appearances indicated that one of these had traveled through the duct.

These cases, which have been observed in the absence of an epidemic, or of the occurrence of a single case of the disease in a person living in the city, not having been on a yellow fever vessel, or come from a place where yellow fever was prevailing, have served to convince me that were an epidemic to prevail, the existence of jaundice in an invalid would in not a few cases lead to a mistake. I would especially allude to the possibility with reference to phosphorus poisoning, and to the fatty infiltration of the liver, and fatty degeneration of heart and kidneys associated with moderate jaundice seen in certain drunkards, especially women. I should be glad to hear from those who have passed through epidemics in large cities on the errors in diagnosis observed, and corroborated by the evidence of post mortem examination.

There is another disease which is at times supposed to exist, when in reality one of the contagious exanthemata simulates it. I allude to cerebro-spinal meningitis. The mistake happens that persons suffering from small-pox and measles are supposed to be ill with the disease above named. The error arises in those severe and malignant cases in which the nervous phenomena are very pronounced, the eruption scanty, little characteristic, and hemorrhagic, or failing to make its appearance owing to the early fatal issue of the disease. Of the necessity for an early knowledge of the nature of this complaint none will entertain doubt. If the disease were cerebro-spinal meningitis, the funeral could be conducted in the ordinary manner, and vaccination of those exposed would be unnecessary. The value of an examination rests in the fact that it will fail to show the evidence of meningitis in those affected with the other diseases.

A simple illustration will perhaps place this matter in its true light, more forcibly than any lengthened argument. Toward the close of the late epidemic of small-pox in New York, my attention was drawn to the case of a young woman, who had died at one of the hotels with supposed cerebro-spinal fever on the fifth day. An examination of the body revealed a few hemorrhagic spots, some of which disclosed a vesicle on the surface. Suspecting from this that the fatal event was due to variola, the body was ordered to be removed to the morgue for examination, and precautions were taken to guard against the spread of this disease. The autopsy disclosed the entire absence of any anatomical feature characteristic of inflammation of the brain or cord, as well as the absence of any structural change in the organs, which would account for death. A few minute hemorrhages beneath serous membranes being all that was found. This settled the matter as far as I was concerned; but the friends of the patient were very indignant, more particularly one man who had taken care of her in her illness, that the disease should be called small-pox, and that an autopsy had been made. Two weeks from this time the man came down with confluent small-pox, of which he later died. Vaccination of those living in the neighborhood, and thorough disinfection of the rooms occupied by the patient, prevented the spread of the disease in that vicinity. It seems to me that no one can doubt of the value of that autopsy to those living in the surrounding houses, nor of the necessity existing for its performance. I do not wish to be considered as claiming too much for autopsies in such cases, so I will briefly recapitulate those facts which led to the decision. 1. Small-pox was prevailing in New York, patient had been ill five days, vesicles were present on the hemorrhagic spots; 2. The evidences of an inflammation of the brain and cord were absent on autopsy, but the proof of death from an infectious disease was observed in the hemorrhages under serous membranes taken in connection with the fact that there was an absence of the evidences of poisoning, which had been previously discarded by the history. Before an eruption had made its appearance an autopsy would not discriminate between the different eruptive fevers, but between these affections and some internal inflammation, particularly the one of which we have been speaking. This matter of mistaking small-pox for cerebro-spinal meningitis was repeated on several occasions during the last epidemic.

Again, in the matter of cholera I have had a peculiar experience. At the time when it was anticipated that the cholera would make its appearance in New York in 1866, I was requested to make a post mortem examination of a man who was supposed to have died of this disease. The autopsy showed internal strangulation of the bowels, owing to a twist of the small intestines and mesentery around the sigmoid flexure of the colon. A physician, who had been called to see the man on a canal boat, had found him vomiting violently, and had hence supposed the disease to be cholera. A careful clinical history, rightly considered, would have lessened the need for an autopsy so far as cholera was concerned.

I might mention ulcerative endocarditis as a disease which may be mistaken for the infectious diseases, and one which I have seen so erroneously considered. Many of the cases of this disease arise after confinement or in the course of pyæmia, when the attention of the physician is drawn to the likelihood of its existence, and consequently less injury is likely to result from a false conception of the nature of the morbid process. I have under these first heads attempted to sketch, without striving for a very exact sequence, nor for rigid system, such direct and evident benefits as would appeal to the mind.

I do not think that any sanitarian will be disposed to underrate the need for more accurate statistical information, nor to concede that it can only be obtained by carefully conducted autopsies. When one reads in a book of statistics to-day, that so many deaths were due to convulsions, paralysis, softening of the brain, congestion of the brain, apoplexy, to disease of the lungs, heart, kidneys, or to tumor or jaundice, he is led to feel of how little value such statements are, without a knowledge of that which produced such conditions as were simply symptomatic, or what the nature of the disease was which affected organs said to be diseased. A large shrinkage would happen in the list of deaths from congestion of the brain, softening of the brain, apoplexy, etc., were post mortem examinations in such cases rigidly conducted. Our experience makes us certain the number of deaths stated to occur from inflammation of the brain are in excess of the reality.

Of how much value are comparative statements of the age, nativity, etc., for illustrations of cases which have died from softening of the brain unless we know whether such softening really existed, or, again, whether it was due to an embolism, a thrombosis, to degeneration of cerebral capillaries, or occurred around a tumor, or hemorrhage, or was a manifestation of the early stage of inflammation?

It would be mere repetition to go over the same ground about other diseases, so I shall not prolong this part of the discussion; but will simply state some of the advantages that would accrue to the community were post mortem examinations more frequently made. Much of the uncertainty of medical practice is dependent upon an insecure diagnosis with no means of correcting avoidable and unavoidable errors, in case death should occur, except by the aid of an autopsy. Should it become the rule, instead of the exception, that post mortem examinations were to be made, a marked improvement would obtain in the treatment of the sick, and in that knowledge of coming events which is often of as much importance to the sick man and his friends as proper treatment. The remark, which is so frequently made to the physician desirous of securing an autopsy, that he can make the examination, if he thinks that he can learn anything which will be of benefit to others, is one which rests upon a substantial basis; for every case will teach something to an inquiring mind. It is an error for a community to anticipate that they will have as capable physicians, if they force them to obtain their knowledge of disease from books instead of from nature. A mistake noted will serve to warn from a like one in the future. I believe post mortem examinations to be as essential to a physician as dissection is to the surgeon. I would here allude to those benefits which I have claimed under the sixth and seventh heads. I do not think that they need any special discussion. Were friends and relatives to know of the appearances in disseminated carcinoma I think that they would appreciate the futility of rubbing a patient in the last stages of this disease, and I believe that other equally useless or positively injurious methods of treatment would be banished from the sick room. In view of the above mentioned facts, we claim that sanitary conventions and authorities should urge upon the people the necessity, the value, and the benefits of post mortem examinations.

XI.

COTTON AS A FOMITE.

READ AT THE SEVENTH ANNUAL MEETING, NASHVILLE, TENN., NOVEMBER 20, 1879.

By J. D. PLUNKET, M. D.,

President of the State Board of Health of Tennessee, Nashville, Tenn.

THAT certain things of animal, vegetable, or mineral origin, which have been associated with the sick, or brought from the atmosphere of infection, have been the means of communicating to individuals, more or less remote, the specific virus of certain epidemic diseases, is a fact unquestioned by all intelligent physicians of this age, as well as of past ages. To perfect a catalogue of such materials or fomites by adding such others as later investigations may have demonstrated as belonging to that class, or by striking from the list those which experience has proven do not rightly come under that head, is one of the most important and imperative duties devolving upon the medical profession at this time. The protection of individuals and communities, more or less removed from the centres of infection, urgently demands it. Commerce, the handmaid of science, calls aloud in no uncertain tone for relief, and begs that every cord be unloosed, and shackle removed, that it may press forward on its mission without let or hindrance, — even in times of dire pestilence, restricted only in such particulars as may be unquestionably necessary for the proper shielding of the people. With the view of eliciting greater interest upon this subject amongst physicians and public-health men everywhere, I have thought it well at this time to bring the matter somewhat before you; and in doing so, I shall restrict the few imperfect remarks which follow to that article of trade which, especially in this section of the United States, preponderates largely over all others, namely, cotton, and its relations to yellow fever, as a fomite.

So far as the present state of medical knowledge relative to this subject extends, it seems to warrant the opinion that the infectious cause of yellow fever is proven to inhere, or remain in, and to be conveyed by any package, spaces, apartments, porous or absorbent materials and textile fabrics that *retain and closely confine the atmospheric air and other gases.*

And in conformity to this view we find different writers putting down as fomites of yellow fever such articles as cotton, wool, woolen and linen cloths, furs, hair, ostrich feathers, dry hides, rags, sponges, vellum, all kinds of paper, tallow candles, on account of their cotton wicks, animals with wool or long hair, coal, woods, ores of copper and iron, ballast and stone of all sorts, old ships and new, freight cars, passenger coaches, — especially those upholstered, — bedding of all kinds, boots, hosiery, silks, empty or filled trunks; and the common clothing even of persons not sick when conveyed, carried, or worn directly *from an infected place*, has been known to carry and communicate yellow fever virus. This list could be greatly extended, but for our present purpose it is unnecessary.

The hypothetical capability of raw cotton (ginned or unginned, pressed or unpressed) to absorb or imbibe pestilential virus, and thereby become the medium through which epidemic diseases may be or have been conveyed from point to point, or even from one country to another, was recognized far back in the history of medicine.

The plague which swept with such destructive fury over London in 1665, and which proved so disastrous to the entire population of that wondrous metropolis, was supposed to have been introduced into London by importation of cotton from the East. And while this fact may not have been sufficiently clear to place it absolutely beyond all question, yet the authorities of England were strongly impressed with its probability, as shown by the rigid quarantine subsequently enforced. "During the plague of 1835," says Dr. Laidlaw, "which preserved its epidemic character from the beginning of January till the commencement of June, and during which period upwards of nine thousand persons in the town of Alexandria alone must have suffered from the disease (two hundred thousand persons, it is computed, having fallen victims to the disease in the whole of Egypt within this period of time), vast quantities of cotton were embarked on board of British merchant vessels and sent to England. The number of vessels so clearing for England was twenty-five, which carried into England no less than thirty-one thousand bales of cotton."

Upon arriving in England these vessels had to perform a long quarantine, as we are informed, "for the purpose of purifying the cotton from the latent *fomes* it was supposed to contain;" and under orders of the Privy Council, Chapter XXXII., it was made the duty of quarantine officers to rip open all bales of cotton so arriving, and by free handling to daily expose it to sunlight and air, emphasis being given especially to handling of the interior of the bales.[1]

The rigid enforcement of these precautionary measures, coupled with the fact that the British Isles enjoyed an absolute immunity from the dreaded pestilence during this entire season, would seem to warrant the assumption, in the absence of positive proof to the contrary, that the same be recognized as an important factor in the result obtained, if not wholly the means of their exemption.

While the weight of modern pathological teachings is clear that the Oriental plague and the yellow fever are two entirely different diseases, each having a distinct specific poison of its own, yet this was not always so, as we find a lack of precision of description in the older writers, and a confounding of diseases which has led some eminent in the profession to argue with much force and plausibility that the numerous epidemics of contagious fever which occurred in various parts of Europe during the first fifteen centuries of the Christian era were the same in cause, and differed in effect only through the modifying influences of atmospheric conditions, locality, and environments, the older writers considering such desolating scourges under the appellation of the plague, — while later contributors speak of them as being in many instances typhus, or, as others prefer, typhus icterodes, which term with us is a synonym of what, from want of a better name, we call yellow fever.

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[1] Extract from *Report on Quarantine by the General Board of Health, presented to both Houses of Parliament by command of her Majesty.* London, 1849.

As nosology grew more perfect, often under one of these ancient cognomens, there was found embraced several distinct diseases, which in turn have since been accurately described and approximately named. So that we find the first recorded epidemic in the Old World of yellow fever, recognized as such, occurring in Egypt in 1797, at La Guayra.

This epidemic is, with much plausibility, referred to the overflowing of the river having the same name.[1]

The historical proverb, " What has been may be again," has its counterpart in What has been may have been before; and if, as in this instance, we find an epidemic of yellow fever originating *de novo* in Egypt after the overflow of the river La Guayra, would it be a violent assumption to infer that yellow fever had occurred there many times before, and therefore it, too, had its beginning far back in the twilight of human history, and from time to time has scourged the race, thus seeming verily to be " the pestilence " of old " which walketh in darkness and wasteth at noonday? " A recent writer on yellow fever draws the following striking parallel between the Oriental plague and yellow fever, from which it will be seen that there are many characteristics in common: —

"The plague occurs on the subsidence of the Nile; so does the yellow fever on the subsidence of the Mississippi. The plague localities are surrounded with ponds, stagnant canals, with decaying vegetable matter exhaling their poisons into the atmosphere, accompanied with great humidity; such is precisely parallel here.

Attacks of the plague most frequently take place at night; the same is generally true of yellow fever. The plague is sometimes marked by jaundice (or icterodes) and black vomit; and yellow fever sometimes has buboes and carbuncles, — as was the case here last year. One attack usually exhausts the susceptibility to the recurrence of the disease, in many instances much more certainly in yellow fever than in plague."[2]

However, be this unity of cause the same throughout or not, for our purpose at present it is immaterial; as the history of a fomite, as a means of disseminating or conveying the specific poison of one epidemic disease, is practically its history, so far as we know, in connection with that of all other diseases coming under that denomination; and we have seen that cotton brought from the distant East, where an epidemic of plague was at the time prevailing, was looked upon by the English health authorities with such suspicion as to induce them to institute concerning it the most painstaking and laborious methods for its purification.

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[1] *Report of the Sanitary Commission on the Yellow Fever in New Orleans in 1853*, by E. H. Barton, p. 337.

[2] *Report of the Sanitary Commission on the Yellow Fever in New Orleans, in 1853*, by E. H. Barton, M. D.

The recognition of cotton as one of the class of extra-hazardous fomites is well-nigh universal, as its capacity to transmit or communicate yellow fever, or other infectious diseases, when exposed to the contagium, has, up to this time, scarcely been questioned.

In 1859 a select committee of the Chamber of Commerce of New York city, reporting upon the quarantine laws of New York harbor, invited before them during their investigation, a number of the most eminent physicians of that city, including the Health Officer and Health Commissioner, and among other questions propounded to these medical gentlemen upon that occasion were the following: —

1. Would you deem it safe for vessels from ports where yellow fever prevails, having had no case of fever amongst their crews while in their ports of departure, or on their passage, or after arrival in port, with a passage of not less than ten days, arriving between the first day of April and the first day of November, to proceed at once to the wharves of that city? And, —

2. If exceptions are to be made, with what cargo, and under what circumstances, should they take place?

And so impressed was this committee, as to the dangers attaching to cotton, that they singled it out from all other articles of freight, and formulated a distinct interrogatory regarding it, to wit: —

3. If cotton is discharged at quarantine, would you permit it to be lightered to the city at once?

To which the following answers were received: —

"Cotton coming from Charleston, and taken on board ship from a *healthy part of the city*, I should infer would not acquire any dangerous properties, if it did not remain more than one week at any of the wharves of that port." — *Dr. A. H. Stevens.*

"A vessel having on board only such persons as had been protected from the fever by previous attacks, or by long seasoning, might safely proceed to the city with her cargo, provided that cargo did not consist of substances that are proved to contain confined air; or, consisting of such porous materials, it was ascertained that they had not been deposited or exposed in any infected locality, the ship itself having been but slightly exposed to such localities, having taken its cargo by lighters or otherwise, when lying far out in the stream, or otherwise removed entirely beyond any infected place, and particularly if the sugar, cotton, or other suspected materials had come directly from plantations, without storage in a sickly port." — *Elisha Harris, M. D.*

"Quarantine assumes that particular articles of commerce, whether of the raw or manufactured material, are capable of absorbing or imbibing pestilential virus, and that thereby epidemic diseases are conveyed from one country to another. Among the articles supposed to be particularly adapted for the absorption of this poison are cotton, wool," etc., etc. — *J. W. Sterling, M. D.*

"Cotton is often brought from the country by railroads or steamboats, and transshipped at once to this port. If the account of the cotton should establish this fact, it being also in good condition, it might properly be lightered at once to the city. But if in bad condition, and long stored in an infected district of the port from which shipped, it should not be permitted in the city before November." — *Jediah Miller*, *M. D.*, *Health Commissioner.*

Much additional testimony could be adduced, if it were thought desirable, to further fortify the assumption that underlies the remarks which have been made above, namely, that cotton, from its peculiarly porous, flocculent nature, is particularly adapted to the absorption or imbibation of the infectious or propagating cause of yellow fever, by readily taking up and retaining the atmospheric air of an infected locality, which we are warranted, both by direct and circumstantial evidence, in believing, is invariably the vehicle or medium for the transportation of this specific virus.

Now, notwithstanding the almost universal opinion among medical men that cotton should rank among the most dangerous class of fomites, or materials by which the air and the infection are conveyed from infected localities where yellow fever exists; yet, having exhausted all sources of information at our command bearing upon this subject, the strange and remarkable fact is brought to light, that not a single case of yellow fever is recorded as having originated from contact with cotton carried from an infected place. Whether this is simply an accidental omission in the chain of evidence regarding this insidious and deadly disease, or whether it indicates an important and valuable scientific truth, through which there may yet be discovered to us the fact that in unwrought cotton there is an attribute (in fibre, volatile oil, or what not) which, like tobacco, neutralizes the virus of yellow fever, and consequently renders it incapable of conveying or communicating that disease, are questions of the greatest moment, and in their solution they become matters of the highest significance to the epidemiologist, as well as to commerce itself, which, should these conjectures be verified by further investigation, will be relieved of fully one half of the present embarrassments which beset its pathway in times of pestilence throughout the cotton-growing districts of the world.

However, until this question is finally determined, by the introduction of proof which is clear and convincing, the quarantine officer will continue, as he has in the past, and justifiably so, to treat cotton as a probable source of danger in communicating disease in time of epidemics; for with such officers it is a motto, if err we must, then err upon the safe side; or, if doubt there be, then give the public the benefit of the doubt.

XII.

MAY NOT YELLOW FEVER ORIGINATE IN THE UNITED STATES?

AN ETIOLOGICAL STUDY OF THE EPIDEMIC AT SAVANNAH IN 1876.

READ AT THE SEVENTH ANNUAL MEETING, NASHVILLE, TENN., NOV. 20, 1879.

By ALFRED A. WOODHULL, M. D.,
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It is commonly held that the yellow fever is due to a specific poison not yet isolated, which, it is conveniently assumed, multiplies itself as would a ferment. From this the conclusions are generally drawn, that the disease cause can only emanate from some preëxisting germ; that therefore every case has, chain-like, a connection with antecedent cases; and that inasmuch as frost destroys the infecting principle, every epidemic in this country must depend, although the line of communication may not be demonstrable, upon a foreign source. That very many of the American epidemics can be clearly traced to importation adds to the probability that they all so arrive, while the requirement to prove a negative affords constant opportunity for contradiction, if not for confutation. Notwithstanding this disadvantage, attention is invited to an etiological study of the Savannah epidemic of 1876 as one that illustrates the occasional domestic origin of yellow fever.

The most of the facts about to be employed have already been published by the writer in the "American Journal of the Medical Sciences," July, 1877, where may be found a fuller recital of some points. To those who regard the ordinary interpretation of the germ theory (or rather hypothesis) as final, and as necessarily disposing of all topics arising under it, nothing can be said. They have begged the question and are satisfied with the logic of their position. But to those who are not certain that scientific perfection has been reached, this resumé is offered.

There was no yellow fever in the United States in the summer of 1876 before it appeared in Savannah. The disease, therefore, must have been imported there or have originated in that city. It was first publicly recognized in the person of a crippled boy, James Patrick Cleary, aged twelve, who died August 21st. Within a very little while it was discovered in widely different parts of the city, and it spread so rapidly that the epidemic condition was declared the next week. Careful inquiry has settled that the primary case occurred in a sailor, J. W. Schull, taken sick July 23d and died on the 30th. This man's occupation at once suggests importation; but, before accepting assumption for proof, the facts must be carefully analyzed, and especially the other early cases be examined.

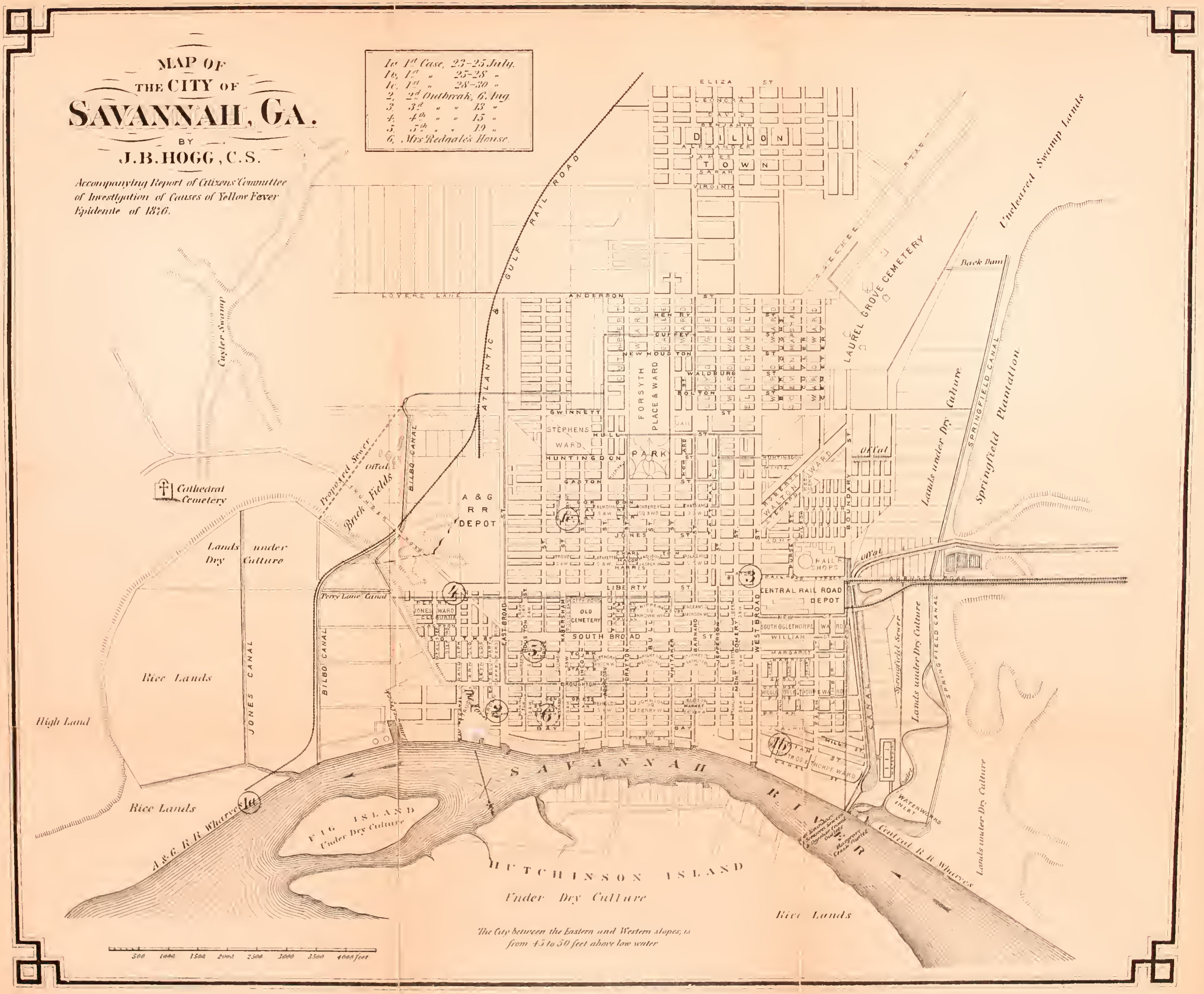
One could scarcely desire more favorable conditions for the study of an epidemic than Savannah presented on this occasion. The town included all classes of society and all conditions of life, affording a fair field for the disease, and at the same time one small enough to be carefully and completely surveyed. It had suffered similar ravages in former years, but it was not constantly thus afflicted, and it possessed interested and intelligent citizens who would gladly point out, if possible, the introduction of foreign seed. I may further explain that Savannah was my proper military station when the fever was recognized; that I left the city with the garrison when the epidemic was declared, and returned in November, spending the four succeeding months in constant investigation of the course of the disease, with the cordial assistance of all to whom I applied. I may add that the conclusions that I reached were utterly at variance with my preconceived notions; and further, that, on reading my original report to the profession there, although the opinions expressed were not concurred in by all, no errors of fact were pointed out, nor were any new or contradictory statements made.

Savannah is built upon a sandy plateau which gradually slopes from a height of forty-five feet at the river to the swamps several miles south. The river flows toward the east along the northerly front. The high ground occupied by the city is a mile and a half wide, and then abruptly falls away into lowlands on the east and west. The estimated population in 1876 was 30,000, nearly half being colored. The main part of the city from the river south, is laid out in rectangular blocks with wide streets and air-spaces; but on each flank the houses, chiefly occupied by the poorer classes, are small and crowded together, and the streets are narrow and irregular. Besides the wharves directly at its river face, there are two railroad wharves, namely, the Atlantic and Gulf, about 1,200 yards below (east), and the Georgia Central 600 yards above (west), the nearest residences.

J. W. Schull, as already noted, was attacked July 23d. He was the steward of the American schooner *F. A. Server*, that had arrived from New York with coal, July 10th, and had lain at the Atlantic and Gulf wharf from the 18th of that month. He was removed in a small boat to a sailor's boarding-house in the western part of the town, July 25th.

We may now discuss the cases that intervened between Schull's, July 23d, actually the first case, and Patrick Cleary's, nominally the first attack, August 17th, and recognized when dying, August 21st. These are best arranged in groups by locality, thus: —

1. The Yamacraw group. The sailor, Schull, reached Mrs. Hearn's boarding-house, Indian Street, corner of Ann Street, in the northwest part of the city, July 25th, and remained there until July 28th, when he was removed to the Marine Hospital in the southeast part of the town. Indian and the adjacent streets have the local name of *Yamacraw*. David Coleman, Mrs. Hearn's son-in-law, who occupied Schull's room and bedding after his departure, went to Darien, Ga., August 16th, had a fever there for four hours



on the 18th; returned on the 19th; had a chill followed by fever, now believed to be yellow fever. His infant child was very ill between the time of Schull's departure and his own attack. Both of these recovered and neither subsequently had yellow fever, although constantly exposed to the epidemic. It cannot be established by professional evidence, but there seems little doubt that they then had the disease. In fact, yellow fever was not recognized in Schull by the very competent physician who attended him at Mrs. Hearn's, nor by the surgeon in charge of the Marine Hospital, whither he was removed after three days. It was only in the retrospect that the nature of the malady was evident. On the 17th of August, a child, Thomas Magner, Jr., living thirty feet from Mrs. Hearn's, was attacked; several other cases occurred in that immediate neighborhood on the 22d, and the disease then spread rapidly in every direction from that centre.

2. The Wright Street, or "Fort" group. The Fort is the local name for the northeastern part of the town near the gas-works, the site of an earthwork in the earlier wars, now inhabited chiefly by the laboring class of whites. August 6, Thomas Cleary, æt. fifteen, living in Wright Street; and between the 6th and 10th James McCarty, æt. thirteen, East Boundary Street, were attacked with this disease. They both recovered. A child of Martha Hart, Reynolds Street, near Broughton (just in rear of McCarty), was attacked between the 15th and 18th of August. Patrick Cleary, æt. twelve, brother of James, attacked on the 17th, died on the 21st. Joseph Lynch, æt. three, five doors from the Clearys toward McCarty, died on the 22d; and numerous cases, within a stone's throw of the cul de sac known as Wright Street, followed at once, and until the material was exhausted the disease ravaged that region, gradually spreading in all directions.

3. The Stone Street group. Stone is a small street opening into West Broad between Harris and Liberty Streets in the western part of the city. On the 13th of August a Catholic priest was suddenly attacked at his residence, northeast corner of Stone and West Broad; on the 24th Mrs. Mary Malcomes, in the next house (on Stone Street, in rear of the priest's), was attacked, and died on the 28th; on the 25th, 26th, 27th, new cases developed in the immediate vicinity, whence the disease spread rapidly, as at "the Fort."

4. The Grandison case. A mulatto child of seven or eight years, living on Randolph Street, near Liberty, in the southeastern part of the city, was attacked on the 15th and died on the 18th of August, with characteristic symptoms. The next case in that neighborhood occurred August 26th, at the junction of Thunderbolt Road with Liberty and Randolph Streets, after which it spread rapidly.

5. The Conners case. John Conners, æt. 10½, 21 York Street, between Price and Houston, was attacked August 19th, and proved a centre of dissemination.

6. The Perry Street group. From August 20th to 24th, cases occurred along Perry Street, from the corner of Jefferson to near West Broad Street, the extension of the disease then merging into that of Stone Street.

We have thus found a number of widely-scattered foci fairly established before popular attention was attracted, or the epidemic nature of the disease was acknowledged. These were Schull, attacked below the city, July 23d, and carrying the disease to Yamacraw, July 25th; the Cleary and McCarty cases establishing it at "the Fort," August 6th; the Stone Street outbreak, dating August 13th; the Grandison case, Randolph and Liberty Streets, August 15th; the Conners case, York near Houston Street, August 19th, and the Perry Street line, about August 20th. Now the accepted belief as to the course of the disease-cause is expressed by Dr. C. B. White, of New Orleans, who says:[1] "The marked localization and very limited range of action of the cause of yellow fever are universally recognized facts." In the same paper, he quotes with approval the rate of forty (40) feet a day as the average speed of the infecting principle. Therefore, if the exotic theory is the true explanation of the cause of this epidemic, each of these groups must have been independently infected from abroad, or at least have been empoisoned from a common foreign source; and, moreover, we may expect the principal seat of that foreign agent to betray itself by the number of the cases and the promptitude of their appearance.

That the disease could not have been contracted in some other place by Schull, or have been imported by the *Server*, follows from his having been attached to that coasting schooner for the preceding thirteen months. during the whole of which time the vessel had not left the United States. But the vessels that arrived from possibly infected ports before the middle of August were five in all, namely: —

1. British brig *Joshua King*, from Cardenas, in distress, arrived June 19th, discharged and re-shipped cargo of molasses in the western part of the water-front, and sailed July 2d. All on board were well during their voyage to and stay in Savannah.
2. Spanish bark *Nueva Ygnacia*, from Matanzas July 1st, arrived July 13th, sailed for Spain August 2d.
3. Spanish brig *Ynez*, from Havana July 9th, arrived July 16th, sailed for Spain July 28th.
4. Spanish bark *Maria*, from Havana July 9th, arrived July 17th, sailed for Spain August 3d.
5. Spanish brig *Pepe*, from Havana July 15th, arrived August 2d, sailed for Spain 9th August.

The next West Indian arrival was the Spanish brig *Maria Carlina*, August 16th, having sailed from Havana July 22d.

Of these, the *Pepe* and the *Nueva Ygnacia* lay at the Central Railroad wharves above the city and six hundred yards from the habitations; and the *Ynez* and the *Maria* lay at the Atlantic and Gulf Railroad wharves, twelve hundred yards below the city. The Central Railroad wharf, and those connected with it, were remarkably exempt. No early cases there are known, and the first death from yellow fever among the employees there was *on the 12th of September*, when the epidermic was general, and only two white men in all died of the disease. The foreign infection, if direct, must have come by the Atlantic and Gulf wharves. At this place the *Maria* lay the furthest of all down stream, and about one hundred and forty (140) yards below the *Server*. But the *Server* lay seventy-five (75) or one hundred (100) feet below the *Ynez*, from July 18th. Schull was taken sick July 23d, and removed on the 25th. The *Ynez* sailed for Spain July 28th, and it is easy to believe that Schull might have been infected through the Spaniard. If the case stood by itself, and the disease radiated from it alone, the probabilities would favor such an origin, the presumption would be accepted by most as a demonstration, and this epidemic would be added to the long list of those whose importation seems settled. And some writers even now insist that such must have been the case, and believe that the general infection of the town was due to the wandering through it of the Spanish seamen who conveyed thither their bedding, and slept there instead of on their vessels. Indeed, before beginning the investigation for the official report from which these data are taken, the writer, who then firmly believed in the necessarily exotic origin of yellow fever, supposed it would be an easy matter to trace this epidemic to the West Indies. But the closer the study the less probable did this become, and it is to the actual facts as well as to the argument that attention is now invited. If imported at all, the vessels themselves, their contents, or sick persons on them, must have borne the infection. Very careful investigation has established that these vessels left the West Indies in ballast, carrying no goods but the personal effects of the seamen ; they brought clean bills of health ; all who arrived on them departed in good health, and no one was ill while in Savannah. They remained from three to seven days at quarantine, sixteen miles below the city, under orders to be fumigated with chlorine, the holds to be white-washed, the upper works washed and generally painted, and the bedding and clothing aired or washed. How far these instructions as to disinfection were carried out I cannot say. The arrival was made in from seven to seventeen days from the port of sailing. The *Server* reached the adjacent wharf to the *Ynez* July 18th, two days after the latter had arrived there, seven days from Havana. Five days later, or 23d, Schull sickened. The infection has been charged to the *Ynez*, from her propinquity, twenty-five or thirty yards, and the rumor that Schull was frequently aboard of her. But both the captain and the mate of the *Server* deny that Schull visited the *Ynez*, or associated with the Spanish sailors, and very careful inquiry has failed to discover any one who will so assert. So far as any direct infection by the *Ynez* herself is concerned, the case is not proven.

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[1] *Public Health*, iii., 154.

But if there had been yellow fever on any of the Spanish vessels almost surely the sailors' bedding would be contaminated. Now the river front at Savannah is highly malarious, and in the summer and autumn it is customary for strange crews to sleep in the town. So far as the Spaniards are concerned this rule is strictly observed, and the crews of all their vessels lodged at Mrs. Redgate's, Price Street, near Bryan, whither they conveyed their own bedding. (It is an error to suppose, as has been stated, that the crews of two vessels slept in the western part of the town.) They cooked on shipboard, returning there early in the morning and remaining all day. It is believed that a watchman, generally one of their own men, was left aboard at night, but all the others congregated at the lodging-house. Not only did the sailors remain well, but every one in that house was entirely free from sickness until the gradual advance of the epidemic from Wright Street, two hundred and eighty-five yards distant, enveloped it. The first case, that of Mrs. Redgate herself, occurred August 30th. It is manifest that neither the men nor their bedding conveyed the disease. It is proper to mention that before he was taken ill Schull refused to leave his vessel at night, but slept on board as long as he was able.

It has, however, been suggested that the ballast might harbor the infectious principle. This ballast is a natural compound of blue clay and a common serpentine, and is taken as native rock from the hill-side at West Regla, about forty feet above the sea and two miles from the harbor of Havana. The hills from which it comes are dry, and in no way subject to drainage from human habitation. Dr. Belot, of Havana, familiar through long residence with the facts, says: "I do not believe that the fresh ballast referred to will, of itself, in any way influence the development of yellow fever. If such were the case, the disease would manifest itself as soon as the ballast is taken in." He adds: "However, if the same ballast is taken into a leaky vessel, after being thoroughly saturated by rain, it will undoubtedly produce miasm when it comes in contact with offensive bilge-water. This ballast when removed must be dangerous." Dr. Chaillé, of New Orleans, in Havana as a member of the Yellow Fever Commission of 1879, as the result of his observation, gives a very unfavorable account of this material as a class. He says: "The ballast from the hills of Regla and the bluffs of Casa Blanca, is deposited for days, weeks, and months along the edge of the harbor, absorbs the tide-water and also the water running down the streets of Regla, where yellow fever is as well known as in Havana, and receives the urine and fæces of passers-by. The hardest of these ballast rocks is very friable and porous, and in the ballast piles or heaps these rocks are intermingled with fine detritus and loose soil."

It is clear that the ship-masters can have no suspicion that it is disease-bearing, or they would not use it as they habitually do. Nor can we suppose that they will accept it when "saturated by rain," for then it degenerates into a pasty mass. At Savannah, where about twelve hundred tons were brought between January 1st and August 15th, 1876, it is used on the roads at the wharf: and the most practical evidence of its harmlessness is that no one connected with the wharf where it was spread, and constantly trodden under foot, was attacked with the fever until his home had first been invaded by the natural progress of the disease. It is true that Dr. O. A. White, of New York, asserts[1] that the only white laborer who handled the ballast died in consequence: but very careful inquiry on my part has failed to discover such a case. On the other hand, there is positive evidence that the ships were unloaded and loaded by the Spanish crews and ordinary stevedores (the latter chiefly black, it is true, but with white captains) working together; that exclusively white watchmen guarded the wharves at night; and that among these, and all the workmen present, not a single early case occurred, nor indeed any that could not be distinctly attributed to domestic infection. The advocates of importation, however, strengthen their case by reference to the fact that Thomas Cleary and James McCarty, the two boys living in and near Wright Street, taken with the fever about 6th August, had been in the habit of playing on the Atlantic and Gulf wharves, and of digging in the ballast there. The boys admit this, but absolutely deny going on any Spanish vessel. Enough further is known of their habits to plausibly account otherwise for their infection.

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[1] *New York Medical Journal*, March, 1877.

The case for importation has now been fairly stated. Epitomized it is: that vessels arrived from infected ports; that a sailor on a coasting vessel lying not far from one of them had the fever; that their crews slept on their own bedding in the town, and frequented the streets as possibly infecting agents; that they discharged upon the wharves ballast, freshly brought from the West Indies; and that two boys who played on that ballast, also had the fever early.

On the other hand, there is not only no proof of sickness, but there is abundant evidence of health among the Spaniards; it does not appear that any of these first three cases was ever aboard a Spanish vessel; the house and the people where the Spaniards congregated ashore were free from fever until it reached there by natural progress; many other persons worked in the ballast and were constantly exposed to its possible dangers without harm; and, finally, for at least two of these cases, a condition presumably adequate as a cause independently of the foreign shipping, can be found.

But if, for the sake of argument, the exotic origin of the Yamacraw and Wright Street groups (Schull and Cleary) is admitted, there are other as distinct foci that are left totally without such explanation. These are the Conners case, four hundred (400) yards southwest of Wright Street, August 19th; the Grandison case, six hundred (600) yards south of Wright Street, August 15th; and, more striking still, the Stone Street outbreak, nine hundred (900) yards south of the boarding-house to which Schull had been taken, August 13th. The occurrence of a primary case of yellow fever in a city, cannot account for nearly simultaneous outbreaks in distinct and distant wards. If, therefore, as I believe, these cases cannot be ascribed to foreign infection, it is necessary to discover a sufficient domestic cause.

Savannah is built upon a sand bed, whose average thickness is not far from thirty feet, that is believed to rest on clay. Permeable soils like this allow from sixty to ninety per cent. of falling water to penetrate, and also permit effluvia from contained decomposing matter to pass through them for long distances. The cleanliness of sandy places, therefore, is often greater in appearance that in fact. As to this date but a few of the important streets are paved, and in the outlying parts of the city paved sidewalks are the exception; it is obvious that very much organic matter must have become incorporated with the soil during its long occupation. The ordinary disposition of refuse, by throwing much of the slops and garbage in the lanes in the rear of the houses, whence the solids are removed by scavengers, and the liquids sink into the ground, adds to the contamination. The disposition of much of the night-soil still further increases the pollution, as will be explained presently. A systematic water-supply was introduced in 1854; dependence previously having been upon wells and pumps which are in nearly all the open squares and wider streets. This pump-water is by some still preferred and used. The sewerage of Savannah virtually dates from between the winters of 1870–71 and 1872–73. It is not sufficient for the whole city, and large parts, especially of the more densely populated suburbs, do not profit by it. The whole excrementitial flow of this system is into the Bilbo canal, chiefly through the Bolton Street main. The small branches emptying into the river on Whitaker, West Broad, and West Boundary Streets, were built for the surface drainage. The general system of sewers, besides receiving the water-closet discharges, is also designed to drain the city by carrying off the heavy rainfalls, and by drying the subsoil. Their transverse section is circular instead of oval, to convey a greater volume, and they are laid dry in their lower courses to permit the subsoil water to leak into them. This construction, however, demands a greater volume of water to move the solids, and in dry seasons allows the contained fluids to leak out, and the adherent decomposing contents to lie in bars and to clog the ordinary water-way. The *extreme porosity of the brick* in common use aids these results. Before sewers were introduced the domestic waste and excrementitious matter, both liquid and solid, passed into ordinary privy vaults or into dry wells. A dry well is a large well-like excavation carried down to or nearly to the ordinary ground water, and walled with bricks, laid dry. This has a dome-like roof that a little below the ground is closed with an iron plate, the whole being covered with earth. To this well pipes from the kitchen sinks and water-closets of one or more houses are led, and in theory the liquid matter passes off through the porous brickwork, and the solids gradually accumulate until they are removed through the top at suitable intervals. But in practice it is found that the grease and oily refuse from the kitchen coat the inner surface of the wall, often rendering it, in effect, impermeable to much of the fluid contents, and thus with age the wells fill up more quickly than at first. They often contain, under considerable pressure, gases which sometimes bubbling through the traps are then discharged upward into closets and basins; and indeed fæcal matter has been actually thrown up into a wash-hand basin connected with such a well. When the vaults, whose walls also were usually laid dry, and the wells required cleansing, it was customary to transfer their contents into holes dug in the public lanes or in the private yards, as the case might be. It is therefore easy to see from the soakage specifically provided for and from the systematic transfer of solids into it, how saturated with excrementitious matter must have been the soil of Savannah. Very many of these common privies and wells, not only without but within the lines of the sewers, still remain in use, and the customary mode of cleansing them is that just described. In 1871 it was enacted that when removed the contents of these temporary receptacles should be deposited a mile beyond the city limits, but after 1873 this became a dead letter and the old fashion prevailed. There, therefore, were in operation in 1876 the primitive method of local deposits just described, and the system of sewers then about three years in operation. The soil of Savannah, although superficially very clean, was really foul, and the air was indirectly tainted from these subterranean deposits. Besides, many of the cesspools and sinks emitted disagreeable odors, and their occasional cleansing in the hot season, although forbidden by ordinance, increased the atmospheric impurities. After the epidemic was recognized water was freely turned into the sewers, but before that period the air in certain localities was very offensive from their emanations.

With the insignificant exceptions already noticed, the sewers concentrate in the Bolton Street line and find a common outlet in a low region in the southeast part of the town. For convenience, a passage for this discharge to the river was sought through an old rice-canal, known as Bilbo's, used in modern years to drain the land under dry culture east of the city. Branches were separated from it as far as possible, flood-gates were provided for the river terminus, and, taking advantage of natural depressions, a somewhat winding ditch connected the Bolton Street outlet of the sewer with the canal proper. This gave an open channel or drain about one and one third miles long, through which the sewage of the city found its way to the river. (Its distance from the town varied from four hundred and fifty to seven hundred yards, and its width at the top gradually increased from thirty to forty feet and at the bottom from twenty to thirty feet. In theory the flood-gates were opened at every tide and the consequent influx and outflow of the river water washed out the channel twice daily. But in fact it was much neglected, and by the best evidence attainable it seems to have been flushed not more than six times that summer before the appearance of the epidemic.) The general evidence concurs in establishing that the canal was very foul. Its waters were sluggish, the influence of the tide when admitted did not extend beyond the railroad crossing, the depth, especially in the upper portion, was slight, innumerable bars in the channel and the irregularities of the sinuous banks detained the fœcal matters, and the torrid sun generated gases that bubbled up through the slimy coating, so that along its whole course the senses of sight and smell were offended. It was in effect a huge, uncovered shallow sewer charged with the excrementitial discharge of a large portion of the city, fully exposed to atmospheric influences and giving off gases that were certainly offensive and were probably poisonous. The number of water-closet connections at that date was less than two hundred, but they embraced many of the larger establishments, such as the hotels and other crowded houses.

Another important feature was that induced by the disposition of the city offal, the scavengers' sweepings of the highways and yards, including dead animals and decaying vegetable matter, in heaps within the city limits on both the eastern and western sides, as shown in the map. These piles, as well they might be, were very offensive. The common on both sides of the Thunderbolt road beyond the railroad crossing is an old brickyard, filled with excavations deep and shallow, generally holding stagnant water. It is also a dumping ground and is generally wet and noisome.

The meteorology may be briefly noted thus: The average mean summer temperature in the shade is about 81° F., the average relative humidity is 75.07, and the usual rainfall for May, June, and July is 4, 5, and 6 inches respectively. The summer of 1876 was universally regarded at Savannah as excessivally hot and sultry; but contrary to the popular impression the temperature, 82° F., was but a little above the average, and that of July and August was only .68° and 1.24° respectively above the usual mean. The average yearly rain-fall at Savannah is between sixty-four and sixty-five inches, but in 1876 it was ten inches in excess, and it was so distributed that three or four times the usual quantity fell in the early summer. It might be presumed, therefore, that the degree of humidity would be an index, if not a cause, of the oppressive feeling, but in fact there was a decided average reduction in the atmospheric moisture, as this table shows: —

Relative Humidity.

	June.	July.	August.	September.	Average.
Average 1871, 1875	72.88	72.16	76.42	78.82	75.07
Average 1876	71.2	68.7	72.6	70.4	70.72

I cannot explain this curious want of relation between sensation and the degrees of humidity and of heat, but the figures indicate that these variations in the meteorological conditions are not important factors in the causation of the disease, and confirm Parkes's remark [1] on yellow fever that "the observations at Lisbon [in 1857] which Lyons has recorded show no relation to the dew-point." But it is none the less true that to the senses there was an appreciable and unpleasant divergence from the customary summer weather. There are no recorded observations of solar radiation and evaporation.

The chief physical differences between 1876 and ordinary years were that malarial causes, owing to the heavy June rain, were in excess, the Bilbo canal, which had no existence in previous epidemic years, was unusually foul, there were large masses of decomposing organic matter in the suburbs, the temperature was one degree higher and the relative humidity three and a half parts in the hundred less than usual, and to the senses the season was peculiarly sultry. Besides, financial pressure had led the municipality to reduce its executive force to the minimum, and it is probable that sanitary evils not immediately conspicuous were longest tolerated.

After this survey of the field in gross we may examine in detail the special conditions affecting the early and apparently independent cases, other than that of Schull. As to that sailor, as has been already explained, there is a total absence of positive evidence concerning his habits, beyond the fact that he stayed closely by his vessel; and there remains, of course, the bare possibility that he alone of all similarly exposed may have been affected by the *Ynez*. The boys Tom Cleary and McCarty were comrades who spent much time along the Atlantic and Gulf wharves, who steadfastly deny boarding a Spanish or any vessel, but who acknowledge that a part of their daily amusement through all that hot weather was to play along the bank of the Bilbo canal, and to disturb its waters by fishing in it and raking things out of it. If that accumulation of filth had any infecting property they certainly were specially exposed to its influence.

Wright Street, which, as we have already seen, exploded as would a magazine when the special spark was introduced, is a cul de sac closed at its eastern end, opening out of East Broad Street. East Boundary, a narrow street, in which McCarty lived, is also a cul de sac in the same block at right angles to and nearly abutting upon Wright Street. This vicinity, the region of "the Fort," has long been inhabited and has a population of ordinary laborers, chiefly Irish, living in small wooden buildings, crowded together with contracted yards in rear, and provided with common privies that are simply walled holes in the ground. The atmosphere was necessarily poisoned by the effluvia from the dense population, the rapidly decaying organic matter under the July sun, and, especially from the numerous open sinks. There are no connections from these houses with the sewer running down East Broad Street, and the primitive cesspools crowded within narrow limits must have filled both the soil and the air with their emanations. In the absence of positive knowledge as to the pabulum of the yellow fever infection, we may readily suppose that it will thrive on what may be generated there when the temperature averages more than 80° F. for the twenty-four hours for weeks together. But those who believe that the Spanish shipping must have been the sole source of the disease will insist that these cases are additional evidence of the correctness of their views. These boys confessedly played near Schull's schooner, the *Server*, and the *Ynez*, from which they suppose Schull contracted the disease. Therefore, they say, it is reasonable to suppose that their cases and Schull's had a common foreign origin. Without discussing that point just now, attention is invited to the Stone Street group, which closely resembles that of Wright Street in its essentials.

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[1] *Hygiene*, 3d ed., p. 465.

Stone Street is a narrow street running from West Broad Street eastward beyond Montgomery, terminating in a cul de sac in the next block. Between Harris and Stone Streets the lots are so shallow that the houses facing on Harris Street, as they all do, present all their privies in a row on the southern side of Stone Street, which is only fifty feet wide. The house on the northwest corner of Stone and Montgomery Streets faces Montgomery Street, and by its side in Stone Street is a dry well that was opened at least twice in the summer, the last time early in August. The only house facing on Stone Street in the short block between Montgomery and West Broad, was that occupied by the Malcomes family. Its privy is in the yard in the rear, and when examined the succeeding January was found to be literally full, although the house had been unoccupied for some months. The northwest corner of Stone and West Broad Streets is occupied by the priest's house of St. Patrick's parish, and the privy used by the servants is in the corner of the yard nearest the Malcomes house. From all these causes the air was tainted to the senses here, as it was in Wright Street, before the outbreak of the epidemic, which when it did occur was especially virulent in the Malcomes house and that vicinity.

Now the primary case occurring in that neighborhood was that of the parish priest himself, the Rev. E. Cafferty, who was seized on the afternoon of August 13. At that time there were but two foci of the disease in the city, both unrecognized, one at Mrs. Hearn's, Ann and Indian Streets, nine hundred yards north, and the other at Cleary's, Wright Street, fifteen hundred yards east. The most careful scrutiny, zealously assisted by the clergyman himself, who fortunately survived, has failed to establish the faintest clue to any outward infection. His parochial duties were confined to the western part of the town. He was not required to go, and he cannot recollect that he did go, to the region of "the Fort," or to the Atlantic and Gulf wharves. He had no connection with the Spanish ship or seamen. He occasionally drove on the Thunderbolt road, but there was no special exposure to the Bilbo canal. Indian Street was in his parish, but nothing took him into the Hearn or Magner houses. (Indeed there was no disease as yet in the latter.) In fine, I have utterly failed to associate him with any possible foreign or any probable domestic source outside of his own house. That house is a one-story brick building, about two feet above the level of the street, with no cellar, and in the summer is exceedingly hot and dusty. His sleeping-room is in the southwest angle of the house (and block), and there is a water-closet and bath-room a few yards distant across the hall and nearer the centre of the house. This apartment is an interior one, and has no ventilation except through the door and by movable sashes in the upper part of the partition into a reception-room directly opposite the priest's room. When I had the opportunity of examining it (27th March, 1877) the characteristic odor was manifest, and I was informed that the air of the house was generally perceptibly tainted. The clergyman supposed the connections to be with a sewer, but I succeeded in finding the plumber who fitted up the room and discovered from his books that the work was done in November, 1869, and that the soil and waste-water pipes are carried into an old well in the back yard near the wall of the house. It is almost certain that the traps are imperfect, and it is manifestly impossible to keep the interior of the dwelling sweet, especially in summer, with the present arrangements; and the position of the well furnishes abundant opportunity for direct soil, and indirect air, pollution. The most unsanitary agent, and the constant one to which Father Cafferty was exposed, was this fountain of foulness in the sultry atmosphere of his own house; and although it led me still further from the preconceived opinions with which I began my investigation, I could only explain the case as a fresh instance of the spontaneous origin of the disease. The next case was Mrs. Malcomes', in the adjacent house, August 24, after which the fever spread rapidly and with great virulence. The second case in the priest's house occurred August 26.

The next case to the priest's, chronologically, and the next illustrating the probable origin of the disease, was that of Richard Grandison, a healthy mulatto child of seven or eight years, living on Randolph Street, near Liberty, about seven hundred yards south of Wright Street, who was taken ill August 15 and died on the 18th. This child had lived in the city but a few months, and was under the care of his aunt, an intelligent colored woman, from whom I obtained a clear account of his daily life. Under the most careful cross-examination I could learn of no suspicious sickness in the neighborhood; the child was habitually kept at home or in that immediate vicinity; he daily attended a small private school a few houses distant; neither he himself, nor any one belonging to the house, or to the neighborhood, as far as known, had any business or association with the Atlantic and Gulf wharves, and no trace, direct or indirect, of connection with other sickness could be discovered. It appears, however, that the special amusement and recreation of this child was every evening to take a pet dog to bathe in the water of the Bilbo canal, or, more commonly, in that of an open drain running into it at the Thunderbolt crossing. This drain crosses the depot-lands of the Atlantic and Gulf Railroad, and over it, near its head, about two hundred yards distant, was a large privy used by the employés. By these foul waters this child was accustomed to play toward nightfall; and although it does not appear that he entered them himself, it was his habit to wash his dog there. As previously mentioned, the next case in that neighborhood was Abram Mendel's, at the junction of Thunderbolt road with Liberty and Randolph streets, on the night of August 26, after which the disease spread rapidly.

The residence of John Conners, attacked August 19, is about four hundred (400) yards southwest of Wright Street, with no intervening cases. This boy played daily in the deserted brickfields, already described, on the Thunderbolt road, and also at the Atlantic and Gulf wharves, his route between the two places being the bank of the Bilbo canal. He positively denies boarding any vessel, digging in the ballast or elsewhere on the shore, bathing in the river or other stream, or fishing or otherwise playing in the Bilbo canal. Between July 29 and August 16, during which period exposure to the disease-cause, whatever it may have been in this case, must have occurred, there was no vessel from the West Indies at the wharves. He did not consort with Tom Cleary and his companions, and I could find no avenue by which the infection might have been conveyed to him from the Wright Street or any other centre.

Another group of cases occurred in the neighborhood of Perry and Jefferson Streets, between the 20th and 24th of August, a locality that is distant eight or nine hundred yards south from Mrs. Hearn's, Indian Street, and about one hundred and fifty or two hundred yards northeast from the Stone Street focus. I did not have the opportunity to critically examine the premises involved; but, regardless of their condition, the connection between this group and any other could not well be made out. I attach, however, no importance to this, because circumstances did not allow a thorough investigation; and, at the most, the evidence, whatever it may have been, would be only corroborative, not decisive.

Several distinct and independent foci, whence the disease radiated, have now been clearly indicated. And even on the assumption that the *Ynez* may have been tainted, which I do not admit as a fact, at least two of these centres, Cafferty and Grandison, are free from the remotest possibility of such contamination. On the other hand, all of these primary cases have had a common exposure, in one form or another, to air-poisoning from superheated or fermenting fœcal matter in excess.

To attach the yellow fever poison to the *Ynez* requires the assumption that she herself was infected, notwithstanding her clean bill of health; that the infection withstood the disinfection and delay at quarantine, which, perhaps, it might indeed do; that all of her crew were insusceptible to the disease; that the blankets and bedding which the crew carried to Mrs. Redgate's, although coming from an infected ship, were themselves uncontaminated; that Schull actually boarded her, although there is no evidence to show it, and the opinion of those who knew him best is to the contrary; and further, that the poison selected, so to speak, him, rather than the stevedores and others, whom business carried aboard. Schull's habits were, however, confessedly not perfectly known; and there is nothing to refute the supposition — although this is but a supposition — that he, too, may have availed himself of the bank of the not distant Bilbo canal as an exercise ground under the declining sun. Such a supposition, which at the least is as credible as that of his intimacy on a foreign ship, would carry him at once into the same category as all the others. Indeed, Schull's entire exposure at the Atlantic and Gulf wharves, whatever may have been the evil, was but five days; and the suspicion arises that possibly the disease-cause in his case antedated that period. He was conveyed from his vessel to Mrs. Hearn's boarding-house in a small boat, and again to the Marine Hospital, in a closed carriage, over a route on which no early case of the disease happened. Nor has any other case been traced to the use of that vehicle.

Many of the same reasons that throw discredit upon the *Ynez* as a disease-bearer, apply to the discharged ballast. There was similar ballast at the Central Railroad wharves, where there was no disease; those engaged in handling it, and those whose daily occupation kept them constantly in the presence of the large quantities used in roadways and otherwise, received no harm; none of the many other occasional visitors to the place of its deposit were sickened, and there is no obvious reason why the infection should select two or three otherwise healthy boys, and leave untouched, both before and afterward, all the others similarly imperiled — if indeed there was real risk.

I wish now to repeat, and to lay special stress upon the fact that, as early as August 13, on Stone Street, and August 15, on Randolph near Liberty Street, initial cases occurred, which the most careful study with very full knowledge of the surroundings, fails in any way to connect with preëxisting disease. The fact that there were solitary cases in the city, nine hundred and seven hundred yards, respectively distant, could influence these by no known mode of operation. And that there were original and independent foci, is strengthened by the circumstance that in each locality the disease spread according to its normal fashion, after but not before the usual interval. In each instance the next case occurred in a neighboring house, eleven days later, and then numerous others followed almost simultaneously. There is nothing either known or suspected as to the nature of yellow fever that allows one to believe for a moment its infecting cause, if only derived from a preëxisting case, would or could leap an interval of many hundred yards to attack a solitary and otherwise unexposed individual, while in all other respects it regularly follows its long-observed and well-recognized laws, both in its original nidus and at this secondary seat.

If the four boys in whom arose the four independent cases of disease were Mrs. Redgate's children, or had been constantly at her house, had they frequented Spanish shipping at quarantine or elsewhere, had the Catholic priest visited boarding-houses or vessels, or had he received foreign goods or been in attendance upon foreign seamen, or had these initial cases been exposed to the infection by association with a fever case, or, indeed, had any known or demonstrable cause of disease exerted its influence upon them, no one would have hesitated in presuming that that exposure, whatever it may have been, induced the fever. In the absence of an admitted agent by which they were imperiled, why may not the coincidence of attack after constant exposure to a condition recognized as predisposing to the spread of the disease when established, be accepted as a step toward identifying the actual cause?

Those who deny the possibly indigenous origin of the disease base their argument upon the assumption that every case must be derived from some preëxisting one, because the germ theory or that of contagium vivum requires it. It begs the question to insist that because direct inoculation from a local cause cannot be demonstrated, therefore importation is the only alternative; and, if allowed, this disposes of the problem in a very summary manner. But the diseases whose causation can be directly demonstrated may be counted on one's fingers. With all others it is a question of analogy and probability. No one denies the propagation of yellow fever from preexisting cases under favorable circumstances. But the same is probably true, for instance, of some forms of dysentery also; yet even epidemic dysentery does not always require a previous case. Even scarlet fever, so commonly and conspicuously propagated by the contagium vivum of a direct antecedent, is occasionally very plausibly associated as to its etiology with decomposing blood and animal matter.

In the case under discussion, it is the disposition to compel what may be the half truth of admitted frequent importation to cover the whole question of etiology that excites protest. Spontaneous generation is held out as the only alternative belief for those who reject the necessity for the uninterrupted connection of every case with preceding cases. But it is perfectly credible that a certain combination of conditions occurring now, will produce results similar to those that followed an identical combination in another age. Hospital gangrene, for instance, will, as far as we can see, spontaneously arise in ill-kept or crowded wards. It may be that the specific germs are floating in the atmosphere, awaiting a favorable receptacle; still the disease is spontaneous so far as concerns its independence of another case. For, admitting as necessary the preëxistence of the specific germs of yellow fever, it is reasonable to suppose that they are diffused as generally now, and have the same affinities as formerly. Either we must believe that were all the natural cases and their descended germs stamped out, the disease would reappear under favorable conditions of climate, population, and filth, or that the first fever case was created simply as a unique experiment, or happened as a mere accident, with no chance of repetition. There is no analogy in the course of nature that leads us to believe such an incident having once occurred would never be repeated. We are rather to suppose that these afflictive diseases, spreading through the violation of sanitary laws, may be removed from the face of the earth by the suppression of their requisite conditions, or may be propagated with special vigor through hot-beds of sanitary impurity, such as Havana, for example, has unfortunately become.

But the cessation of the disease under the influence of frost is one of the stronger arguments in favor of the popular view. It is the common opinion that frost arrests the spread of the fever by destroying the fever-cause, which may be well taken; and that as all parts of the United States may be touched by frost, therefore that cause, not sustaining continuous existence in this country, can only be renewed by importation, which is not a necessary consequence. The fever-cause is not necessarily an independent, self-propagating germ. But assuming it to be such, it is not required to believe that its vitality is destroyed by cold because the disease ceases to spread at a certain temperature. Nor, whatever the character of the germ, does this cessation imply the loss of power in the sense of destruction or annihilation of life. Excessive cold or intense heat doubtless does put an end to the propagating power, but these artificial extremes, and it is only such that can be relied on for this purpose, destroy animal as well as cryptogamic and other life, and are not met with in nature. On the contrary, the degree of cold that will extinguish an epidemic does not certainly devitalize the fever-cause, because this, when transported to a more favorable locality, may excite the disease anew; or, as it is claimed in the case of privies and and other receptacles not disinfected, may cause a fresh epidemic in the same place the next season. The conditions for the spread of the disease are complex, and the precise influence of temperature is not clearly understood; but it is perfectly credible that the morbific influence fails in the absence of heat, because then either its own fertilization or its fructification is wanting.

For if, for argument's sake, we assume a vital fever-germ, there would be no reason *a priori* why the patient or his clothing that would prove an infecting centre in the city would be harmless in the country. But experience establishes that unacclimated persons in country-houses and camps, although in warm climates, are usually safe, notwithstanding direct association with the sick brought there. The explanation in that case is the absence of some necessary factor, such as filth or crowd-poison. And so in the extinction of an epidemic the reduced temperature may as well indicate the expression of some other factor, as that the special germ itself has died. Fever fails to follow the exhibition of the assumed fever germ in a cool place, not necessarily because those germs are dead, but as plausibly because then the filth or other emanations are inadequate for their support or multiplication. That germ-death follows frost is as yet unproven. For just as saccharine or vinous fermentation requires heat for its manifestation, so does this disease-cause; and the cessation of the disease no more implies the annihilation of the germ than does the abeyance of fermentation, beyond certain limits of temperature, mean the destruction of the ferment. That is to say, if we assume that there are certain living organisms whose presence is essential to yellow fever, we may also assume that over a large portion of the United States these organisms will preserve a continuous, although it may be an inert or inactive, existence; and, equally, that in their potential capacity, awaiting favorable conditions for fertilization, they may have existed indefinitely. This explanation of the independent and preëxisting yellow fever cause is not presented as the necessary or even the probable theory to account for the disease. But it is offered to show that even on the assumption of such a preëxisting specific cause the conditions do not necessarily require importation to fulfill the scheme.

But the germ theory in its integrity does not compel belief in an infinitely extended ancestry of germs, each identical with its predecessor and its successor, and each capable of exciting some specific disease immediately upon the victim coming within its range. With more confidence we may imagine an infinite variety of self-propagating germs, each set of which may gradually yield to adjacent influence, as is conspicuous in the cultivation of vegetation, and is shadowed in animal life; and then suppose that with the metamorphosis induced by the surrounding conditions the yellow fever cause is gradually evolved. These presumed changes, although perhaps involving many generations of germ-life, may easily be accomplished within the period of a single season, and would be developed with a rapidity proportional to the propitiousness of the situation. If such a modification has occurred once it may occur a thousand times. This view is perfectly consonant with the essence of the germ theory, and at the same time it is not inconsistent with the facts as I believe they are found in practice. But pending the discovery of a fever-germ self-propagating and unchanging, or of one that has been evolved with more or less regularity and promptness from the transient conditions of locality and the demonstration of its career, it is equally plausible to explain the cause of the disease, as in the first place the effect of the conjoined emanations from decomposed organic matter under meteorological and other conditions not yet clearly understood, and then possibly intensified by passing through the human body. The compound that arises from these emanations, the effluvia themselves, or the venom that creates the specific mischief, may disintegrate or perish in the absence of heat.

Yellow fever, indeed, occupies a position midway between the ordinary malarial and the true specific diseases. It closely resembles the former in that it only spreads under certain favorable climatic conditions, therein differing from the specific affections. It is believed that the marsh fevers arise — although their cause has no more been isolated than has that of yellow fever itself — chiefly from the decomposition of vegetation under heat and moisture. When the temperature falls sufficiently the disease-cause fails. Now it appears that yellow fever follows exposure to organic filth decomposing under conditions whose limitations are not clearly defined, but that, unlike the malarial disease, when once lodged in the human system it acquires additional propagating force. The disease-cause, however, is suspended or destroyed, as the case may be, like theirs, under the influence of cold. The patient, as a rule, acquires immunity from a second seizure, bringing the disease into relation with the specific fevers; but prolonged absence renders him liable to renewed attacks, just as the remittents may be repeated. And further, it is probable that in some epidemics the malarial influences distinctly modify the primary disease. There is, moreover, the curious insusceptibility of the pure black and yellow races to its impressions, which increases its likeness to the last mentioned class.

But, passing by such theoretical resemblances, and recurring to the facts as already presented, we find in this epidemic much of Savannah prepared as a very nursery for the disease, just as the flats of Happy Hollow, below the bluffs of Memphis, were in 1873. At Memphis a direct importation was made, and from it the disease spread step by step. At Savannah, in 1876, no importation is proven, nor, to my mind, is probable; but five distinct outbreaks occurred at disconnected and distant points within a comparatively few days, indicating that at each of those places the morbific elements had independently coalesced, or that the special cause had acquired its peculiar characteristic or vitalization. Those nearly simultaneous explosions are wholly unlike what one would find from the introduction of a single infecting agent; while, on the other hand, from each of these foci the infection followed its usual course of gradual development and radiation. The suggestion has, indeed, been made, that perhaps the pathological discharges and débris from the autopsy of Schull at the Marine Hospital was the medium of specifically poisoning the Bilbo canal, and of thus infecting the boys who played in it. But, while such infection has no known precedent, the case of the priest at Stone Street can by no possibility be covered by it. And whatever may ultimately be determined as to the origin of this or of any other epidemic, it is certain that at Savannah, in all those regions where the disease made its fiercest and most deadly onsets, the pollution of the soil and air by human excreta was most marked. I believe that the same condition has been or may be observed elsewhere; and it is just such defilement that characterizes the Spanish-American towns, where the endemicity of yellow fever seems established. In the epidemic under discussion, on the strength of many instances that there is no room to rehearse, I am confident that a complete topographical survey of its field would show the points of greatest sickness, and those of the most offensive privy arrangements, to closely coincide. A map of the one would clearly indicate the other.

Nothing contained in this paper should be construed as depreciating the importance of a judicious and efficient quarantine. That yellow fever may be imported, and, being introduced to favorable conditions, will develop fearfully, is too well established to require discussion; and that an intelligent quarantine may exclude foreign disease, the experience of the port of New York demonstrates. But there is a propensity to rely too much upon the protection afforded by this artificial barrier. At New York, the single avenue to be watched simplifies the task; but at the South, one break in the long cordon from the Chesapeake to the Rio Grande may allow the disease foothold, and then land as well as sea must be guarded. The feeling of security born of the doctrine that yellow fever is necessarily exotic, in union with that of the efficacy of quarantine, is ill-advised, for it fosters domestic negligence, and tends to condone our own sanitary sins by special rigor towards those of our neighbors. For, especially in the lower latitudes, cleanliness is more important than isolation. It is obvious that external infection should be excluded when possible. But the foreign disease requires domestic filth for its support. Quarantine is useful; cleanliness is vital. As has been expressed by another,[1] the attempt to keep out such diseases when ordinary conditions of sanitary prudence are violated, is like the efforts to extinguish individual sparks falling near heaps of powder: we run imminent risk of being blown in mid-air with our extinguishers in our hands. But we can at least avoid an explosion by the removal of the powder heaps. Fortunately, dirt and filth alone are not sufficient to produce disease, nor are all stinks deadly in proportion to their vileness, or the world would have been well-nigh depopulated ere now.

[1] Pettenkofer on Cholera.

XIII.

HOW TO DEAL WITH A FIRST CASE AND EARLY CASES OF YELLOW FEVER GENERALLY, WHEN, IN SPITE OF PRECAUTIONS, IT HAS MADE ITS APPEARANCE.

READ AT THE SEVENTH ANNUAL MEETING, NASHVILLE, TENN., NOVEMBER 21, 1879.

By J. CHANDLER, M. D.,
Of Memphis, Tenn.

THE suggestions herein offered for the management of first cases of yellow fever are based upon the following assumed characteristics of the disease, namely: —

That the virus matter of the disease is, from the commencement of the attack, constantly exhaled from the lungs, skin, excreta from the bowels, vomited and expectorated matters; that this virus matter adheres to the surfaces and pores of various substances and is by them transported from place to place, and is from them transmitted through the atmosphere, as a circulating medium. It is inhaled by persons from the atmosphere and again exhaled from the lungs. It seems to be incapable of being transported any great distance through the atmosphere — adhesion to solid substances being the mode by which it is transmitted. The measures necessary to check the spread of the disease will embrace isolation, and the exercise of every means calculated to destroy as much as possible of the infectious matter which is being constantly exhaled during the whole course of the disease.

In regard to isolation, when possible, not only the patient but every member of the family should be moved to quarantine to avoid further contamination, and to await the development of the disease. Our quarantine grounds should be provided with isolated cottages of two classes — one class for families, and the other containing only two rooms for a single patient; the family cottages being adapted for genteel families. With such an arrangement, families would have less repugnance to going there. The removal of the patient and family should be undertaken, if possible, only by persons who have had the fever, and as soon as that is accomplished, they, as well as the physicians and vehicles, should be treated as infected persons and articles, as will be described hereafter. The house with all its openings should be at once closed and subjected to the most thorough sulphur fumigation, burning all carpets, mattresses, etc. If the house were isolated it would be advisable to burn the house and contents.

The privy vault and yard should be well drenched with sulphate of zinc, or zinc and iron. If the house is in close proximity to others, the other houses should be thoroughly fumigated with sulphur.

If neither patient or family can be removed, all the nurses required, with a physician, should at once be put into the house, which should be immediately surrounded by a reliable guard to be continued day and night, and all ingress and egress strictly forbidden. All medicines and supplies should be left at the gate or door. A barrel of dry earth, sulphur, sulphate of zinc or zinc and iron, and charcoal for burning the sulphur, should be at once sent there. All the carpets in the house should be at once sprinkled with coal oil or carbolic acid, taken up, and put into barrels or hogsheads, when they should be again liberally sprinkled with the coal oil, to be subsequently burned. The bed on which the patient lies should be covered with oil cloth ; a bucket full of dry earth should be put in the sick room, and every evacuation from the bowels and all vomited or expectorated matters should at once be covered with dry earth. Before emptying such matters they should be well drenched with a strong solution of sulphate of zinc or zinc and iron. Dry earth has been amply tested by British East Indian surgeons and found to be perfectly efficacious for checking the diffusion of infectious matter. By this means a very prolific source of infectious matter will be obviated. In the programme for destroying the constantly accumulating infectious matter, every inmate of the house should daily change all clothing and subject it to a thorough fumigation. In fact, every woolen and cotton article of clothing and bedding should be daily subjected to this fumigation, and even the bedding of the patient should be included — a room being set apart for that purpose.

Unless this is done it becomes saturated with the poison from the body, and the patient is poisoned with his own exhalations. This can easily be done, by first spreading upon the floor a sheet, then on this, one by one, the blankets, when they should all be smoothed and rolled up into a roll ; this should then be placed across the breast of the patient, and beginning to draw down the soiled bedding, follow it with the clean, by simply unrolling, by which the patient will not be exposed. Rolling this soiled bedding closely together, it should be at once carried to the fumigating room, thoroughly fumigated and afterwards boiled. Every glass, plate, cup, etc., used by the patient, should, before being washed, be immersed in a strong solution of zinc or zinc and iron, otherwise a careless servant may wash them with others. If the patient dies, he should be at once wrapped tightly in two sheets, wetted with zinc, and at once placed in a well sealed coffin. The mattress, feather-beds, and pillows should be at once sprinkled with coal oil, or carbolic acid, and put into barrels or hogsheads, when they should be again drenched with the same, to be hauled off and burned. Every article of clothing and bedding that is not to be burned should be at once fumigated and then boiled. The privy and yard must be disinfected.

All the nurses and physicians should be quarantined in the house for some days, until they have exhaled the infectious matter from their systems. The members of the family, if they have not had the fever, should be quarantined a sufficient time to allow the fever to develop. If the adjoining houses are in close proximity, it would be well to vacate them at the commencement of the attack.

It is usual in first cases of fever for several physicians to be called in consultation, who thoughtlessly go from the fever case, with their clothing infected, to other patients. They should be compelled to go to some unoccupied room, where their clothing should be changed and disinfected.

These appear to be trivial details, but it is to be borne in mind that the success of the whole scheme depends upon the conscientious observance of every detail. A partial isolation or quarantine is neither isolation nor quarantine, and is a criminal deception upon the public, who intrust the management of such matters to Boards of Health.

XIV.

THE YELLOW FEVER EPIDEMIC IN MEMPHIS, 1879.

READ AT THE SEVENTH ANNUAL MEETING, NOVEMBER 20, 1879.

By G. B. THORNTON, M. D.

The appearance of yellow fever in Memphis during July last, and the results which have followed its spread, have attracted, perhaps, more attention than those of any epidemic of the same magnitude which has ever occurred in this country.

The causes of its outbreak involve questions of profound interest not only to the citizens of Memphis and country immediately adjacent, but to the entire Mississippi valley, whose feelings of security and vast commercial and social relations have been so materially threatened or interfered with by its reappearance in its very heart.

It is of particular interest to the American Public Health Association, to whom the people are beginning to look as the body which gives direction to legislation pertaining to public hygiene.

The question of importation and of local origin is not definitely settled by the resident profession; each side has its advocates, nor am I myself satisfied as to the date and exact locality of the appearance of the first case.

In every epidemic of yellow fever which has preceded this one, there has been no trouble in tracing the disease to direct importation. Similar questions arose as to the epidemic of yellow fever in New Orleans last year.[1]

The first case was reported to the Health Office on the 8th of July. It died on the evening of the 9th. The presumption is that it had been sick at least four days before death. An autopsy proved beyond question the nature of the disease.

On the morning of the 10th, a number of suspicious cases were reported, five of which proved to be yellow fever. These six cases were in three distinct localities in different wards of the city. The first one reported was in the Sixth Ward, No. 204 De Soto Street (Mulbrandon's), three at one house in the Tenth Ward, at No. 425 Wellington Street (Judge Ray's), both in South Memphis, and two at one house in the Eighth Ward, No. 55 Bradford Street (Tobin's), in the extreme northeastern portion of the city, at least a mile on a direct line from either of the other two.

Two of these cases died during the night of the 9th. They were not reported to the Health Office earlier than the morning of the 10th. The physicians in attendance seem not to have been sufficiently confirmed in their diagnosis of yellow fever to justify them in reporting these as such sooner. There had been no known communication between any of these cases. They were among people who had neither business nor social relations with each other. Judging from the clinical history of the cases, each must have contracted the disease about the same time. One died on the afternoon of the 9th of July, two on the night of the 9th.

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[1] See Article by Dr. Joseph Jones in *New Orleans Medical and Surgical Journal* for March, 1879.

The three were visited by different physicians who at the time were not thrown together professionally, consequently it is not reasonable to suppose that the infection was conveyed from one to the other, nor is there evidence to prove that they contracted the disease from the same point about the same time. I am strengthened in this opinion from the occurrence of cases later in the summer and fall, both in the city and suburbs where the infection could not be traced to direct communication with the sick, and when very scrupulous precautions were taken to prevent contagion. One death occurred on the night of July 8, at 81 Clay Street, in the Tenth Ward, in the neighborhood of the second case reported (at 425 Wellington Street, Judge Ray's), and which was classed under the head of suspicious cases, but was treated as malarial fever. The attending physician afterwards stated it was his belief that it was yellow fever. This belief was confirmed by several parties contracting the disease a few days after the death occurred, who lived in the immediate neighborhood (at 86 Clay Street), and were with the party while sick. Errors of this kind, if this was one, have repeatedly occurred in the beginning of epidemics of this disease in the practice of experienced physicians. The gentleman above referred to may justly be so classed, for his experience has been acquired from four epidemics, in one of which he was the subject of the disease himself. I mention this circumstance as one throwing some doubt as to the reported case on the 8th being the first which occurred. After the 10th no more cases were reported until the 15th, and two of these were people who lived at 86 Clay Street, just referred to.

The disease has appeared in houses in the suburbs which were infected last year, among people who had no direct communication with the sick this year, and who observed very rigidly local isolation.

Whether the infection was in the houses or in furniture, bedding, carpets, clothing, etc., is an open question with me, though if contracted from either I am inclined to think it was from the latter. All claim that their houses were thoroughly ventilated and exposed to the cold weather of last winter; many that artificial means of disinfection were used.

The house 204 De Soto Street (Mulbrandon's), Sixth Ward, and 425 Wellington Street (Judge Ray's), Tenth Ward, and 55 Bradford Street (Tobin's), Eighth Ward, in which the first three cases reported occurred, were unoccupied last year during the epidemic, consequently we cannot attribute the origin of these cases to house infection. I have it on credible authority that when Tobin and wife returned to the city after the epidemic of last year, they purchased and used some second-hand bedding, and that some bedding, and perhaps clothing, was used in Mulbrandon's house, which had been used the year before during the epidemic by relatives who died of the disease. Whether any means of disinfection was used or not I am unable to state. In the City Hospital, an institution which I had charge of, there was the most thorough infection of everything pertaining to it in the way of bedding, ward furniture, etc. All available means of disinfection were used not only while the epidemic lasted, but afterwards of wards and ward furniture of every character. No case has occurred there this year which can be justly attributed to the infection of last year, though many of the same articles are still in use. While this circumstance does not prove that the infection could not be held over, it is at least strong evidence that goods once known to be infected can be disinfected.

I was informed by Dr. W. L. Coleman, an inspector of the National Board of Health, that he had evidences of importation which to him were conclusive. I hope he will demonstrate it as a matter of fact. I have seen no report from him on this subject, if he has made one, nor from any one else; consequently am not prepared to discuss the importation theory. Being not only officially interested in Memphis, but personally so from long residence, and, as a consequence, from social and business interest, I am very reluctant to believe the disease originated among us; but the evidences of local origin are to me so positive, and those of importation so negative, as far as I know them, that I am forced to the conclusion that the disease arose from the infection of last year, which remained dormant until the atmospheric conditions favored its redevelopment. If such is the case, it does away with the theory of some that, under these circumstances, the disease loses its specific character, and will not reproduce itself, or that an epidemic can only be produced by fresh importation.[1]

If the disease was introduced here last June or July, as the case may be, from whence did it come? It is reasonable to assume that the National Board of Health would have been informed of its existence south of Memphis, or anywhere else in the country, if such had been the fact. At a convention of the Sanitary Council of the Mississippi Valley, held in Memphis, April 30, it was agreed that all Boards of Health there represented should be promptly notified by cipher telegram of the appearance of the disease in the locality of either board. That cipher was never furnished me, and consequently I did not communicate the knowledge of the first case to the different boards as agreed by the Convention.

The National and State Boards of Health were both notified of the first case immediately by their respective resident members, Dr. R. W. Mitchell, of the former, and Hon. John Johnson of the latter. How the report got into the press dispatches I do not know.

The object of this cipher telegram was, as I understood, to give timely notice to those in authority to take such steps as they might think advisable towards quarantine.

I, being an advocate of quarantine, as I am now, insisted on the Convention pledging itself to it under these circumstances. Fortunately the National Board of Health now assumes this responsibilty, and will coöperate with any State, county, or municipal Board of Health which adopts and enforces its regulations and calls upon it. The past epidemic has demonstrated very conclusively the utility of this organization, in preventing the arbitrary and irresponsible local organizations known as "shot-gun" quarantines, the outgrowths of panic, which would be ridiculous were it not for the serious inconvenience they entail upon commerce and travel.

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[1] See *Conclusions of the Board of Experts authorized by Congress to investigate the Yellow Fever Epidemic of 1878*, page 15, paragraph 27.

The experience of this epidemic, the first the National Board has had to deal with, has not only had the moral effect of allaying public apprehension and given confidence in preventing the spread of yellow fever by the ordinary lines of transportation, both by river and rail, but has demonstrated the practicability of allowing commercial intercourse without serious impediment and subject to very little inconvenience.

It is not reasonable to suppose that a perfect system of quarantine inspection of freight and passenger travel, especially under the impulse of harm from impending danger, could be enforced without some delay and inconvenience. Defects which experience has developed will no doubt in due time be corrected, and the country in future will not only feel a sense of security, which it has not heretofore had, but enjoy the great practical good which must result from intelligent and efficient coöperation of an organized Board of Health system.

As soon as the disease was recognized, all available means of disinfection, isolation, and depopulation were practiced, and for nearly a month the disease seemed, with the exception of a few cases, to be confined to the neighborhoods where it first appeared. This gave reason to hope that there would be no general epidemic over the city, and it was not until August 10 that formal announcement of a general epidemic was made. It was then impossible to say that any portion of the city was not infected, unless it was the Ninth Ward, or what is known as Chelsia, a ward more isolated than any other, and occupied almost entirely by residences, many of which were vacated.

Appearing, as it did in July last, at four known points (and perhaps others), in thickly populated neighborhoods, in different portions of the city, at or about the same time, among a people susceptible to its influence, in an atmosphere favorable to its spread, disinfection and isolation alone, as heretofore practiced, cannot be relied upon to eradicate, or, as technically termed, stamp it out. These means have failed repeatedly as a radical measure when the disease has become firmly established under the above circumstances.[1] This year in that city[2] these agencies seem to have proven more successful: perhaps the meteorological conditions were not so favorable to the spread of the disease, or means for combating it were better than heretofore. The resident population there is not so susceptible as that of cities further north. While disinfection has proven inefficient heretofore in Memphis in stamping out the disease not only in the last, but also in the preceding, epidemic, in both of which it was promptly and energetically practiced, I believe it can be eradicated by a thorough disinfection of household effects and infected places during the winter, and by a proper local sanitation. When this is accomplished, Memphis, to have yellow fever again, must have it as it had on every occasion previous to this one — by importation,

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[1] For thorough test of disinfection, see *New Orleans Medical and Surgical Journal* for March, 1879, article by Dr. Joseph Jones.

[2] New Orleans.

The disease may have been imported this year. If such was the case, the epidemic was, in my opinion, due to two causes: importation and local origin.

The work of disinfection and destruction of infected goods was actively and persistently practiced by the local Board of Health, from the date of the first death until August 16. After that time, as per agreement between State and local Boards of Health at the McKenzie Conference, the State Board assumed this duty, and, with the assistance of the National Board, prosecuted the work by the most liberal expenditure of disinfectants, applied in what is thought to have been the most approved methods.

For a detailed account of this work, reference is made to the official reports of Dr. J. W. Ross, inspector of the National Board of Health.

In August last, in response to a circular letter received from Dr. Turner, Secretary of the National Board, inviting reports on the sanitary condition of Memphis, and sanitary work being done there, I addressed him a communication, of which the following is an extract, and which is not irrelevant to this part of my subject: —

"As far as we are capable of judging from external appearances, Memphis at present is as cleanly as any city in the country of the same size; perhaps more so. There is not a public thoroughfare in or about the city that can be considered in an unsanitary condition, unless it is from the decayed and decaying portions of the Nicholson pavement blocks. The work of cleaning streets and alleys was commenced in February, immediately after the organization of the Board of Health, and this feature of sanitary work has never stopped. The sanitary condition of private houses, aside from the objectionable system of privy vaults, will compare favorably with other cities north or south.

"It is a questionable point with me, whether these vaults had anything to do with the origin of yellow fever here this year, though in the absence of proofs of importation, I am of the opinion that the appearance of the disease was due to influences from last year's epidemic.

"Whether these influences were from the miasms of privy vaults, impure sewers, polluted soil, or from fomites, as woolen goods and bedding, which had been used by the sick of last year, and not properly disinfected afterwards, I will not now discuss. The general impression of the profession here is, the disease had its origin among us, and I at present participate in that opinion. The work of local sanitation is in daily progress, and everything is being done that is justifiable at this season of the year, and can be done under the existing circumstances. The work of disinfection, not only of houses where yellow fever occurs, but of all privy vaults, is being done under the immediate authority of Mr. Johnson, member of the State Board of Health, as per agreement made between State and local Boards of Health at McKenzie, August 16.

"These vaults, many of which were emptied of their contents during the past winter and early spring, are now being disinfected with strong solutions of sulphate of iron and lime.

"The disinfection of bedding, clothing, carpets, and rooms in which yellow fever occurs, is promptly and efficiently treated with zinc and iron solution, and fumes of sulphur. Bedding and fabrics that are so soiled as not to be rendered harmless by this process are destroyed by fire in a furnace constructed for this purpose. These goods are first saturated with carbolic acid, and carried in covered carts from the houses where used to this furnace, which is located under the bluff near the river, and there destroyed by a process which it is thought, prevents the spread of the infection from them.

"The work of taking up a portion of the wooden pavement and replacing it with stone is now in operation, and will be continued as fast as circumstances admit, until it is all removed. The wooden blocks from the street are burned in the furnace as any other infected material, thereby serving a useful end for fuel. It is intended as soon as the weather is cold enough to justify the work, to have every privy vault in the city emptied of its contents and filled with earth. These are to be replaced by earth closets where it is impracticable to connect with a sewer and use a water closet. There are two things in which Memphis is defective in regard to sanitation, and all sanitary work is but secondary compared with these essentials. That is, a proper underground sewerage and a more thorough surface drainage. The sewerage at present is so limited as to be totally inadequate to the necessity. The topography of the ground is such as to facilitate the former and afford a very perfect system were the means at command for the work. The latter would follow as a consequence when the contemplated system of paving is complete, which is now in progress. The soil here is of a light porous character which facilitates *sépage*, consequently there exists in many localities an injurious soil saturation, which in some instances has rendered impure some cisterns improperly constructed, and in too close proximity to the vaults."

The substitution of either dry earth or water closets, in place of the present very objectionable system of vaults will be enforced, at the expense of property owners, this fall and winter as rapidly as possible.

As so much has been published in various newspapers throughout the country, both editorially and by correspondents, about the neglect of sanitary work in Memphis, it is but simple justice to the present authorities to briefly refer to the condition of the city when the present government was formed.

The sanitary condition of Memphis was never as good as it should have been. With very good natural advantages, there has not been a proper system of sanitary work perfected, such as is needed for a fair trial of its ability for resisting epidemic influence of any character.

The last epidemic of yellow fever was unprecedented in this locality, and all attempt at sanitary work, worthy of mention, was suspended during the epidemic until the following February. The Board of Health was disorganized by the death of Dr. J. H. Erskine, the health officer, and the illness of the President and Secretary, Drs. Saunders and Brown, and when reorganized after the epidemic it did not receive that support which the necessities of the situation demanded. I presume the neglect of this all important work was due to the fact that those in authority anticipated what was then in contemplation, a radical change in the form of government. That is, an abolition of the city charter by the State Legislature, which convened in January, and perfected this change on January 29. On the abolition of the charter a new government was formed, known as a legislative council, to administer the affairs of the city, now designated a Taxing District.

This legislative council was not organized until February 8.[1] It received none of the assets of the old corporation nor assumed any of its liabilities, consequently it commenced with nothing in its treasury, and with no immediate credit, except what was granted to it by the individual indorsement of its members. It formed its ordinances and organized the several departments of government as rapidly as practicable.

The Board of Health was organized late in February, and at once commenced sanitary work. I will not attempt to describe the unsanitary condition of the city at this time; indeed, no practical good would result from it. Suffice it to say that for seven months in a city with a population of forty thousand, no public work, for reasons above given, had been attempted, and very little by private parties.

Consequently, for the new government, without funds, to put the city in thorough sanitary condition in the brief space of four months, for several weeks of which all work was suspended, pending a decision of the Supreme Court as to the legality of its existence, was simply impossible. However, its members seemed impressed with the importance of sanitary reform, and were disposed to enforce the health ordinances, and execute the orders of the Board of Health as far as practicable.

The sanitary condition of the city on the outbreak of yellow fever in July, aside from the decayed Nicholson pavements, as far as could be judged from appearances, was as good, if not better, than it had ever before been. All the streets and alleys had been thoroughly cleaned up in February and March. An efficient system of garbage carts, modeled after similar systems in other cities, for the removal of daily accumulations, was in successful operation. This form of sanitary work had never before been tried in Memphis. In addition to this public care a great deal of sanitary work was done by private individuals, a system of inspection being enforced by the Board of Health through a limited number of sanitary police detailed from the regular police force. In May, the operations of the Board of Health were supplemented by an organization of citizens known as the Auxiliary Sanitary Association, with Dr. R. W. Mitchell of the National Board of Health as its chief sanitary adviser. This association exhibited commendable zeal in the work it undertook, and rendered some valuable assistance to the Board of Health. I will here take occasion to refer to an official communication of September 22, published in the "National Bulletin of Health" of October 4, and, if possible, disabuse the writer's mind of some erroneous impressions he seems to be under, or at least answer the charge he makes in the following paragraph. In speaking of Memphis: "Sanitation, as there practiced, has not in my judgment been directed with the intelligence and zeal her terrible lessons might have been expected to arouse. The opposition to the enforcement of Rule 6, concerning cotton, and the tearing up of the Nicholson pavement during the epidemic, are quite in keeping with the removal of fever-poisoned refuse and night soil during July last. Dr. Johnson of the Board and myself deprecated this latter action during our visit in July last, and discountenanced the proposition then mooted to remove the Nicholson pavement before the advent of cold weather."

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[1] Thus causing an interregnum of about three weeks between the operations of the two governments.

The only privy vault cleaning after the first of June was in those cases where it was thought absolutely necessary, and then when disinfection and deodorization was practiced at the same time, and all night soil was conveyed to the designated point on the river in air-tight barrels.

This work was being done there to this limited extent after a conference with Dr. Mitchell of the National Board, who was actively coöperating with the Local Board through the Auxiliary Association.

On June 12 the Board of Health published an order forbidding any more work of this character unless by special permit, when it was done only in extreme cases, and then under police surveillance. In regard to the tearing up of the Nicholson pavement during the summer, none was done until August 29, after the disease had become epidemic through the whole city, and then only on a portion of the street along which there were only warehouses or cotton sheds, with the exception of a few houses which were but partially occupied. Consequently, this could have had no influence in inducing the outbreak of yellow fever in July, nor did it influence its spread after it did appear. In this connection I will introduce a communication made by myself to the Legislative Council on this subject, which I presume elicited the comment made by the correspondent of the "Bulletin."

MEMPHIS, *June* 5, 1879.

HON. LEGISLATIVE COUNCIL, —

Gentlemen: In compliance with your instructions to give you an opinion in regard to the danger involved to the public health in the removal of the Nicholson pavement on Madison Street, and replacing it with stone from Main Street to the Charleston Depot at this season of the year, I have the honor to submit the following: —

The sanitary condition of this street at present is perhaps worse than any other in the city, owing to the fact that so much of the present pavement is decayed and already displaced. The removal of this and replacing it with stone by the plan proposed does not, in my opinion, increase the liability to disease, as no grading of the street is proposed, and the earth is not disturbed, the grade being already fixed. The space uncovered by the removal of the wooden pavement is to be recovered the same day or very soon by stone, and the wooden blocks burned immediately or otherwise disposed of so as not to be prejudicial to health. Leaving out of consideration the imperative necessity for the improvement of the street for the commercial interest of the city, I do not think the sanitary condition of the neighborhood will be made worse while the work is being done; but will be materially improved after the work is completed. In view of these facts, the present very bad sanitary condition owing to the decay of the wooden pavement, there being no necessity for interfering with the earth for the purpose of changing the grade, the rapid mode to be employed in replacing it with stone, the great sanitary advantage obtained after the work is done, and the imperative necessity for the improvement to the commercial interest, I have no hesitation in recommending the immediate execution of the work. Respectfully

G. B. Thornton, M. D., *President of Board of Health.*

The imputation that this work could have created yellow fever in Memphis is too absurd to admit of discussion. That it may have developed endemic diseases, towards which there may have been a predisposition, or intensified any disease which did prevail, is possible, but in this instance there are no facts to prove that such was the case.

When the circumstances as expressed in the communication are considered I hold that the advice was justifiable, especially when there was but one of the cases, that of Mulbrandon's, at 204 De Soto Street, which occurred on one of the paved streets; the other two localities, where the first cases were reported, being distant several squares from the pavement, — one, Tobin, at 55 Bradford Street, one of the most elevated positions in the city, and the other Judge Ray's, at 425 Wellington Street, a wide, sloping street more in the suburbs, though within the corporate limit.

As to any opposition to Rule 6, the Legislative Council was only represented during the epidemic by Chairman D. T. Porter, the other members being absent. He, both personally and through the Local Board, coöperated with and supported every order of both National and State Boards of Health, and enforced their rules as far as practicable. Now that the epidemic is over there can be no just objection to stating that while those in authority at Memphis duly appreciate the efforts of the State and National Boards to do all in their power for the good of Memphis and the people of Tennessee and adjacent States, and make proper acknowledgment for such services, they mean no disrespect, and do not criticise their action in any spirit of fault-finding, when they state that the preservation of the yellow fever contagion in baled cotton is a purely theoretical question which is not verified by preëxisting facts, and the onus of proof rests on those who raised the question to show one instance, after the amplest opportunities for doing so are given, where seed or lint cotton handled in an infected locality by the ordinary means of ginning, baling, or compressing has been the medium for the transmission or propagation of the yellow fever contagion.

The estimated population of Memphis at the commencement of the epidemic, according to the reports of Colonel Cameron, Superintendent of Camps, was 38,400. My estimate was that it was rather over 40,000 than under. There were in the several camps adjacent to the city, within five to ten miles, 24,800. According to his report the population was reduced by depopulation to 13,600, about two thirds of which were blacks. I herewith append a tabulated statement compiled from the records of the Board of Health, showing the number of cases reported, also number of deaths. Prompt and active depopulation prevented a repetition of an epidemic like that of 1878.

Cases.

Months.	White.	Colored.	Total.
July	153	35	188
August	320	363	683
September	240	208	448
October	132	73	205
November	8	–	8
Total	853	679	1,532

Deaths.

Months.	White.		Colored.		Total.	
	Deaths.	Per cent.	Deaths.	Per cent.	Deaths.	Per cent.
July	52	.339	5	.142	57	–
August	134	.419	43	.118	177	–
September	116	.483	43	.206	159	–
October	65	.492	15	.205	80	–
November	12	1.50	–	–	12	–
Total	379	.444	106	.156	485	.31

This report is made up to include November 15, 1879.

XV.

QUARANTINE, AND ITS RESULTS IN THE STATE OF ARKANSAS IN 1879.

READ AT THE SEVENTH ANNUAL MEETING, NASHVILLE, TENN., NOVEMBER 21, 1879.

By R. G. JENNINGS, M. D.
Little Rock, Ark.

In 1878 quarantine was established by the Little Rock Board of Health. Though possessing no legal authority beyond the extent of five miles, yet through the concert of action of local boards of health in other incorporated towns, and the generous support of the people, who hoped to escape the scourge of the yellow fever by this means, an effectual quarantine was maintained and rigidly enforced during the year that proved a formidable barrier against any great extension of yellow fever in Arkansas. It, however, was transported to Augusta in Woodruff County, Helena in Phillips County, and Hopefield in Crittenden County, opposite Memphis, where, though late in the season, the disease displayed itself with energy, and at the latter place with considerable fatality. But a local board, however central, cannot exercise legal authority all over the State. It was the desire and general anticipation of a majority of the people of Arkansas that the next session of the Legislature would remedy this unwise exercise of authority, however willingly submitted to as a public necessity, by the passing of an act creating a State Board of Health. Accordingly, a bill for the establishment of a State Board of Health was submitted to the General Assembly of the State of Arkansas at its session in 1878–79, but for some unexplained reason failed to become a law. The State Medical Society of Arkansas, at its session in May, 1879, upon the recommendation of its President, Dr. A. A. Horner, in his Annual Address, which having been referred to a special committee met the approval of the Society, —

"*Resolved*, That the President of this Society appoint nine members of the same, who shall act in the capacity of a State Board of Health, as far as practicable, and under the sanction of the State government. That this committee shall organize by the election of a president and secretary, and shall endeavor to secure membership in the Mississippi Valley Inter-state Sanitary Commission on the same footing as a State Board of Health."

The President of the State Medical Society appointed as such committee the following members, namely: Drs. E. R. Duval, J. B. Cummings, W. M. Lawrence, E. T. Dale, D. A. Linthicum, J. A. Dibrell, Jr., A. L. Breysacher. J. T. Hamilton, and L. P. Gibson. Upon motion, the President, Dr. A. A. Horner, was added to this committee. This committee representing a State

Board of Health, organized by the election of A. L. Breysacher, President, and J. A. Dibrell, Jr., Secretary.

The gentlemen constituting this board were all men of prominence in the profession, representing the interests of the various sections of the State, but possessing no legal authority, they remained passive until called into action by the proclamation of the Governor.

The Local Board of Health of the city of Little Rock, upon the first appearance of yellow fever in Memphis, quarantined against that city on Friday, the 11th day of July, 1879, and placed an embargo on the Memphis and Little Rock Railroad, permitting trains to run from Little Rock to Forrest City, and then only under restrictions executed through a medical inspecting officer who accompanied such trains. Medical inspectors were at the same time stationed on the St. Louis, Iron Mountain, & Southern Railroad, one on the Cairo division of this road, and one at St. Louis, Mo., to prevent any persons from traveling on these great thoroughfares who were from any infected district or place, unless they complied with general quarantine regulations. This board was acting under an act of the Legislature of the session of 1874-75, which gave authority to any chartered or incorporated town to establish quarantine, but were restricted within a radius of five miles. Under this act all the towns in any manner liable to infection organized local boards of health, and inaugurated quarantine regulations.

These local boards acted generally in concert with the Central or Little Rock Board; occasionally their action did not harmonize; local prejudices and jealousies now and then caused considerable disturbance, and were somewhat difficult to appease.

About the 1st of August it became apparent that the finances of the city of Little Rock were nearly exhausted, and that she could not much longer bear the burden of expense attending so extensive a system of quarantine. Several expedients were attempted in order to raise means to continue the quarantine, but these efforts proved practically inadequate for the purpose. When matters had reached this crisis, the Governor, William R. Miller, issued his proclamation on the 5th day of August, calling the Board of Health, established by the State Medical Society, to assemble together in the city of Little Rock on the 9th day of August.

The Governor in this proclamation uses the following language: —

"The statutes of the State have provided for quarantine only within circumscribed limits, immediately surrounding incorporated cities and towns; and the want of due coöperation existing between the various local boards of health does, and must of necessity, tend to weaken their efficiency."

The State Board of Health convened in the city of Little Rock on the 9th of August, the day designated.

Dr. L. P. Gibson, who was acting as an inspecting officer, resigned, and the President of the State Medical Society appointed Dr. R. G. Jennings in in his place.

This board made, through the Governor, application for pecuniary assistance to the National Board of Health, which was generously granted. An executive committee, consisting of the President, Secretary, and R. G. Jennings, was elected, to whom was entrusted all business when the board was not in session.

On the 15th day of August mounted patrolmen, to act as guards, were stationed at Hopefield, along the river front, with instructions to prevent all communication with the infected city of Memphis. These guards were under the control of a medical inspecting officer appointed by the State Board of Health. The extent of river front guarded was some twenty-two miles, extending both above and below the city of Memphis. The year previous there had been one hundred and eight cases of yellow fever in Hopefield, of which number twenty-six had died. At the date of the establishment of the quarantine at this place, its sanitary condition was anything but good ; besides the houses where there had been cases of yellow fever and deaths the year before had never been properly cleansed and disinfected. The State Board immediately had the place put in a thoroughly healthy sanitary condition, and every house fully disinfected, and every precaution, deemed of any practical utility, taken to prevent the originating of yellow fever from causes or germs remaining from the year 1878, which it was thought, should such exist, would under favoring conditions spring into activity and perpetuate the continuance of the fever as it had done on the opposite side of the river. These efforts were eminently successful, as not a single case of the fever occurred in Hopefield. There was a case first reported to the State Board as possessing suspicious symptoms ; and afterwards, *i. e.*, after death, as a genuine case of yellow fever. This party — named Webb — went from Forrest City, where existed considerable sickness, also reported as suspicious to the board, to Hopefield, where he died on the 13th day of October. Upon the first telegram of this party having suspicious symptoms, the medical officer was instructed to isolate the case, prevent ingress and egress from the building where he was sick, except the nurses ; and, after his death, all bedding and everything in his room liable to contain infection was ordered destroyed by burning, the house thoroughly disinfected, and no person permitted to occupy it until after the expiration of ten days. This prompt action prevented, we have every reason to believe, the recurrence of another case of the fever at Hopefield during this year. The reports to the Board in respect to this case were as follows : October 10. Inspecting officer Sneed reports " all quiet on the river front." October 11. " Considerable excitement here caused by a man being sick. I think he has a very bad attack of malarial fever. Don't think he will recover. Am perfectly satisfied it is not yellow fever." October 13. " The patient died this evening, 3.25. I am positive it was yellow fever." Though conflicting and directly contradictory, the report plainly indicates that the inspecting officer was inexperienced in yellow fever ; and, as the case came from where the fever had not been known to exist, it was wholly at variance with his expectations and views. The State Board of Health acted from the first as though the case was a genuine one of yellow fever ; hence, if it had proved, as at first diagnosed, " a bad case of malarial fever," the extra precautions would have then served a very useful purpose ; in neither event would it have produced unnecessary excitement among the people, but would rather have inspired confidence in their safety, in their seeing destroyed every apprehended source of danger.

The first intimation that the State Board of Health received of any suspicious cases of fever at Forrest City, was on the 8th day of October, when Dr. Cummings telegraphs : "There is some excitement here over the death of a lady and child. Think there are no grounds for it, will write fully." In his letter of the 8th of October, giving quite a lengthy account of the case of Mrs. Keathley, its progress in detail, Dr. Cummings concludes that, "while I must admit that there are some grounds for doubt, yet I am fully convinced that the disease was malarial fever. One thing is quite certain in my mind, that is, if it is yellow fever it originated here." In response to telegrams of inquiry, Dr. Cummings, of the 8th of October, says : "I attended the parties during their illness. They had no chance of infection." Again, same date, he says : "A malignant form of malarial fever produced by this unusual hot weather, — we are having more sickness within the week than at any time during the summer." Again Dr. Cummings, of same date, says : "I am of the opinion that the patient died of malarial fever, but I cannot say that there is no room for doubt. You will appreciate what I say, when I give you a history of the case. I can say this, that after the most careful investigation I can find no possible chance of infection. The lady was an invalid for five months, and, with the exception of attending the funeral of a patient who died from a surgical operation, has not been out of her own yard for five months. The child that died was her infant, six weeks old."

From this date until the 13th, a period of five days, the Board of Health received no particular statement of any change at Forrest City. On the 13th Dr. Cummings reports, "a fever of high type ; irritable stomach, albumen in urine. Disease has suspicious symptoms." The Forrest City Board of Health met October 13th, and telegraphed the State Board as follows : —

Resolved, "That a malignant form of fever is now prevailing in Forrest City, of kindred type to yellow fever. Said disease has not assumed an epidemic form. We, therefore, advise all persons desiring to leave to do so at once." (Signed) J. B. CUMMINGS,
President Local Board of Health.

HENRY HALBERT, *Secretary.*

The following instruction was telegraphed Dr. Cummings by the State Board of Health : —

"Take every precaution to isolate all cases — allow no communication with the sick — will send you disinfectants on application. Report frequently. Have Board of Health take charge of affairs."

The reports to the State Board of Health from this date are altogether too meagre to afford anything like a detailed succinct statement of facts. Forrest City had a population of between 1,200 and 1,300 people. A regular stampede followed the announcement that the hitherto suspicious cases of malarial fever were genuine yellow fever, — so that only between sixty and seventy persons, about equally divided between the white and colored, remained. The town was thoroughly guarded to prevent infection, disinfectants used liberally, and every effort possible made to stay the progress of the fever, but, notwithstanding these exertions, the disease was only checked entirely by the advent of frost. On the 20th of October there had been sixteen cases reported and thirteen deaths. On the 21st of October three new cases were chronicled.

Dr. R. W. Mitchell, in his report of the yellow fever outbreak at Forrest City, published in the "National Board of Health Bulletin" of November 8, says: —

"Dr. Cummings, President of the local Board of Health, informs me that the first recognized case of yellow fever occurred October 2. Most of the cases were among the best people in the town, living in houses comparatively isolated, and many of them new. Ten of the thirteen deaths were among ladies, nine of whom were married. Exposure in nursing the sick and attending funeral services accounts for the mortality among the ladies, who on the latter occasions are collected in a close room about the corpse, while the men generally remain outside. The first case probably occurred earlier than the date given, but correct information cannot be obtained, owing to the absence of those acquainted with the circumstances."

If the report of Dr. Mitchell is correct, as to the date of the first case of yellow fever appearing in Forrest City, it is certainly very singular and strange that Dr. Cummings should have withheld this information from the State Board of Health, with whom he was daily and often hourly in communication. The Board is certainly unable to account for this omission on the part of Dr. Cummings, for not until the 13th of October did he, in any of his communications, have a doubt of the character of the disease prevailing, which he characterized as a "malignant form of malarial fever." Dr. Mitchell has an ingenious method of accounting for the fact that the yellow fever at this place was confined almost wholly to females. His hypothesis may be true, and we must accept it until something more plausible and ingenious is proposed to supersede it. Various rumors have reached Little Rock that dry goods from Memphis had found their way around the State guards at Hopefield into Forrest City, and hence the yellow fever preponderance among the ladies. Whether there is a shade of truth in these rumors we have no means of ascertaining. We sincerely wish that a thorough investigation may yet be ordered by the National Board of Health, through a disinterested commission, as to the origin of the yellow fever outbreak at Forrest City. If it be true, as Dr. Cummings says in his letter of the 8th of October, that "one thing is quite certain in my mind, that is, if it is yellow fever it originated here," the question of quarantine is at once ended. The disease, we have every reason to believe, was genuine yellow fever; it has been officially so declared, and it is of the most vital importance to the profession, the various Boards of Health, the furtherance of science, and also one of the great questions of this Association, namely, quarantine, that the origin of the fever at Forrest City be investigated, and if possible made known.

Dr. Mitchell, in his report, does not mention this point; but says that correct information cannot be obtained, owing to the absence of those acquainted with the circumstances. Possibly at this time sufficient facts could be obtained that would give a certain clew as to whether it was imported there from Memphis, or originated as an indigenous product of that locality. If the yellow fever originated in Forrest City, the quarantine established in Arkansas, which has cost several thousand dollars, and been attended with innumerable inconveniences to the people, placed an embargo upon commercial relations, restricted general business and social intercourse among the people, has proved of doubtful practical utility. If, on the other hand, it is demonstrated beyond question that the infection of yellow fever was smuggled into Forrest City from Memphis, then the quarantine is not so much to blame as those parties who have been guilty of the transaction, and the utility of quarantine as a factor in the preservation of the public health is not invalidated or weakened one particle; but on the contrary measurably strengthened.

Individually, and until further enlightened upon this subject, I frankly confess that I entertain the opinion that the yellow fever outbreak at Forrest City is the result of imported infection, and not an indigenous product of that locality; for if the latter, why has not yellow fever prevailed in that place in years past? If, therefore, the yellow fever at Forrest City results from a secret violation of the quarantine established by the State Board of Health, it practically demonstrates the necessity of a more rigid quarantine, and that we could have expected successful results would have attended the quarantine in Arkansas, had not the same been violated.

Forrest City is the only point where yellow fever has prevailed in the State during the year 1879. It is true a yellow fever outbreak occurred in Concordia, Miss., opposite the eastern boundary of Arkansas, imported from Memphis, where it prevailed to a considerable extent. The State Board of Health, immediately upon its learning this fact, stationed mounted patrolmen or guards on the Arkansas side of the Mississippi River, opposite at points deemed advisable to prevent intercourse from that infected locality, and not a single suspicious case occurred in this section upon the western side of the Mississippi River. Hence no other inference can be drawn, but that a thorough system of quarantine, rigidly enforced, *guarantees* a certain degree of protection, if not exemption, of the people, from a visitation of yellow fever proportionate to the vigilance of the officers and guards, who are charged with the enforcement of its regulations.

XVI.

THE INEFFICIENCY OF QUARANTINE IN THE STATE OF ARKANSAS DURING THE YEAR 1879.

PRESENTED AT THE SEVENTH ANNUAL MEETING, NASHVILLE, TENN., NOVEMBER 21, 1879.

By JNO. B. CUMMINGS, M. D.,
Of Forrest City, Ark.

SINCE it is generally conceded that in the prevention of the spread of yellow fever from places already infected, there is little if any virtue in disinfectants, and that prophylactics for this disease are as yet undiscovered, and since, therefore, the main, if not the only, dependence of neighboring as well as remote communities seems to be in a discontinuance of all communication with the epidemic centre, and consequently, in the enforcement of a rigid and complete system of quarantine, it becomes of vital importance to inquire to what extent this has been successful in the past, and whether or not, in the present state of our local laws, it can be rendered effectual. In what I am to say upon the important topic, I shall confine myself locally to the State of Arkansas, and specially to the town of Forrest City, where it is known we had late in the present season an outbreak of the fever in its most malignant form, fifteen out of twenty-two cases having died.

Before proceeding to discuss the general question, it may be well to give briefly my experience during the past year as to the quarantine regulations in our State. And a short account of the outbreak of the fever in our town. I will here first state the fact that in Arkansas there is no general law regulating the subject, — no provision for a State Board of Health, and no means established for the prevention of the introduction of contagious or infectious diseases from abroad.

The general law regulating municipal corporations in the State has, however, a provision in it for the creation by such municipalities of local boards of health, and for the establishment of quarantine at such localities, which may extend not exceeding four miles beyond their corporate limits.

The action of some of our principal towns in stopping and supervising public conveyances many miles beyond their corporate boundaries, is, as I am informed, without the shadow of authority of law. It would seem to be self-evident in so serious a matter as that of guarding against the advent of a malignant epidemic which might cost the lives of thousands of our people, that those who take steps to protect the commonwealth should be clothed with ample legal authority to do so ; but most unfortunately this is not the case in Arkansas. The facts in relation to the means taken to prevent the spread of the fever in 1879 and the introduction so far as known, and the cause of the disease in the only locality in the State infected, are these: On the 11th day of July, it will be remembered, the first case of yellow fever was announced in Memphis (Mulbrandon's case). On the 14th day of July the city of Little Rock quarantined against the city of Memphis; two days later the town of Forrest City also quarantined. The city of Little Rock, about the 20th day of July, raised the quarantine as far as Forrest City, on the Memphis and Little Rock Railway, trains running tri-weekly between the points.

The local Board of Health of the city of Little Rock placed a health officer on each train whose duty it was to see that every passenger had what was termed a clear bill of health, that is to say, had not been in an infected district, or exposed to yellow fever, for at least twenty-one days.

Health officers were also placed on the trains of the Iron Mountain Railroad with like instructions.

About the 22d day of July Forrest City placed on duty special guards on every road leading into the town, which guards were continued until the establishment of a quarantine at Hopefield, Arkansas, and even then only part of the guards were taken off.

Persons from abroad frequently complained of the rigidness of the local quarantine at Forrest City. There was no lack of watchfulness and zeal on the part of our local authorities. Should it ever be deemed advisable to enter into an investigation of the matter, abundance of sworn proof could be produced to establish the fact.

On the 9th day of August the governor of the State called into active service a committee of medical gentlemen appointed by the State Medical Society, known as the State Board of Health, which was at once recognized by the National Board of Health as the State Board of Health of Arkansas. The National Board when applied to at once offered means to prevent the introduction of yellow fever into the State. The State Board of Health thus organized thought it wise to establish a quarantine at the following points: Hopefield, Arkansas, opposite Memphis, mouth of St. Francis River, mouth of White River, Arkansas City, and at Moork on the Iron Mountain Railway.

On the 15th day of August ten mounted men were placed on duty at Hopefield, a State Board Medical Inspector being placed in charge with orders to prevent all communication with Memphis.

This small force (five on duty at a time) were to guard nearly twenty-two miles of river front. The number of men was afterwards increased to seventeen. Between Memphis and the Arkansas shore a constant traffic was carried on in skiffs. These skiffs would land above and below the pickets and finally between them, for the reason that parties when arrested could not be punished, owing to our inefficient laws on the subject.

Being at Hopefield frequently during the time, I asked Mr. Johnson, superintendent of quarantine in Memphis, if it were possible for him to aid us in stopping this traffic.

President Breysacher of the State Board of Health made a similar request of Mr. Johnson. A short time before thus requested (though I don't know that it influenced Mr. Johnson) a mounted police force was established around the city of Memphis, the traffic however still continuing.

Other points along the Mississippi River were equally as poorly quarantined, for instance, President Breysacher, under date of September 28, to the National Board of Health, says, " Health officer at Helena, Arkansas, reports trouble in preventing negro cotton pickers from Memphis crossing over into this State, and it is a well-known fact in my section of country, that negro cotton pickers did come out from Memphis."

To further show the inefficiency of the quarantine system of Arkansas, I have been informed by reliable parties that Memphis newspapers three and four days old could often be had in the City of Little Rock. I know that Memphis papers were received at Forrest City by way of Little Rock direct from Memphis. Also persons have told me that they could have left Memphis and in four days have been in Forrest City by way of St. Louis.

After the endeavors of the State Board of Health and the local authorities of the town of Forrest City to prevent the introduction of yellow fever, on the 2d October a case of undoubted yellow fever occurred in the person of Mrs. Keathley, the wife of a merchant of the place; this lady had not been out of her own yard for five months, with the exception of attending the funeral of a lady who died after a surgical operation. Mrs. Keathley was seized with the chill in about two hours after returning from the grave.

There was a case that probably antedated Mrs. Keathley, to which infection Mrs. Keathley was exposed. From these cases, as a centre of infection, the epidemic began, resulting in the death of some fifteen persons, in a total number of twenty cases. From the fact that the local medical profession differed as to the nature of the disease, it was not until October 13th that the Municipal Board of Health officially announced yellow fever. Up to this time some twenty persons, mostly ladies, had been exposed. The Local Board of Health advised depopulation of the town, which was quickly accomplished.

Very soon the National Board of Health was requested by Inspector Winn and the president of the Local Board to aid in enforcing complete non-communication between the town and country adjacent. To this request the National Board gave sanction. This non-intercourse was continued ten days during the unusually warm weather that we were then having. The fact might be mentioned that the dead were not allowed to remain unburied more than two hours after death; the corpse was simply wrapped in a sheet wet in the zinc solution advised by the National Board of Health. The bedding, clothing, carpets, etc., were then burned, and the room fumigated with sulphur fumes. While I am free to confess that such a system of quarantine as was established after the depopulation of the town is of untold value, I must say that the system which simply stops public carriers and oppresses commerce is utterly worthless and an outrage on the people.

I am led to the following conclusions from the foregoing facts:—

First. "That an infected place should be promptly and thoroughly depopulated."

Second. "That a rigid quarantine should be established about the town or city itself, permitting none to leave who remain, and none to enter from the outside."

Third. "That the sick should be isolated as much as possible from the well."

Fourth. "That prompt burial of the dead, and destruction of clothing, bedding, and all furniture of the sick-room, upholstered with cloth, or hair, including the carpets, should be enforced."

The above rules were observed at Forrest City, and the result proves their efficiency. With the exception of the Keathley's, only one case occurred in any family. How in every instance to secure such action as that at Forrest city is a question I am aware attended with much practical difficulty, and proper discussion of it would perhaps trench upon the domain of politics.

To make it effectual in every case it must have the sanction of the law of the land, and statutes when enacted would be useless unless punitive. The power and authority to act, when given, must be accompanied with the power to enforce action and punish disobedience.

The people have a right to look to their government for protection from an enemy who steals upon them secretly, as well as from a foreign foe, who comes with a proclamation of war in his hands. But what government, is the question? If we are in this matter relegated to the States it is vain to hope for relief, divided as many of them are by boundary lines purely imaginary. Yet no one could expect concerted action amongst thirty-eight different commonwealths. But united and concerted action are absolutely necessary to meet the case, and it would therefore seem manifest that there is but one power in America which can completely and effectually deal with it, and that power is the government of the United States. I am not a politician, nor a constitutional lawyer, but I do know through experience in the last five years of my profession, that while our national legislators are splitting hairs about the constructions of clauses in our organic law, thousands of their fellow-citizens are losing their lives from the ravages of a disease which I believe could be greatly lessened, if not entirely eradicated, by the enactment of proper statutes.

XVII.

THE YELLOW FEVER QUARANTINE OF THE FUTURE, BASED UPON THE PORTABILITY OF ATMOSPHERIC GERMS, AND THE NON-CONTAGIOUSNESS OF THE DISEASE.

READ AT THE SEVENTH ANNUAL MEETING, NASHVILLE, TENN., NOVEMBER 20, 1879.

By HENRY FRASER CAMPBELL, M. D.,
Of Augusta, Ga.,
Chairman of the Committee on Endemic, Epidemic, and Contagious Diseases, in the Board of Health of the State of Georgia.

MR. PRESIDENT, — The object of the present remarks, as may be inferred from the announcement on our Programme for this evening, is to consider carefully some of the objectionable features of our present system for combatting the extension of yellow fever epidemics, and to suggest such reasonable modifications as, haply, may render practicable as well as efficient our quarantine measures for limiting similar epidemics in the future.

A SKETCH OF INLAND QUARANTINE.

As early as April 9, 1856, after a discussion of the yellow fever epidemics in Charleston, Savannah, Augusta, and Macon, as they prevailed during the season of 1854, the Medical Society of the State of Georgia,[1] then holding its seventh annual meeting in Macon, appointed a committee to report upon the following important subject: " Are there any means by which the extension of yellow fever into the interior may be prevented?"

As the question of "The transportation of yellow fever of 1854 from the coast to the interior by railroads" had been opened by me at that meeting, my name appears as chairman of this committee. The above discussion and specific assignment is, so far as I have been able to find, the first record of a distinct suggestion of the agency of railroads in transporting this disease, and also of the first attention given by sanitarians anywhere to the quarantine of railroads to prevent the spread of yellow fever.[2]

From the above date to the present time more or less attention has, at long intervals, been bestowed upon the various influences and instrumentalities by which the epidemics of the coast have been propagated inland, and among them railroad communication by freight and travel has at times been recognized as a probable promoter of yellow fever prevalence in the interior towns and communities of the South and West. The study of such, and of all influences and relations pertaining to yellow fever, has been, however, naturally and reasonably more or less interrupted by long intervals during the absence of that active interest evoked by the actual or recent presence of epidemics. Most happily, it is only at comparatively distant periods, generally, that the dreaded visitant makes its advent in our seaports, and even less frequently have we suffered from such interior invasions as have of later years become more common, and as have marked its terrible history in 1876, and again in 1878, and yet again in 1879.

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[1] Now known as the Medical Association of Georgia. See *Southern Medical and Surgical Journal*, vol. xii., p. 318, May, 1856.

[2] If this statement in regard to records on the above subject is erroneous I will most thankfully acknowledge the kindness of a correction.

The first recognized inland incursion of yellow fever in Georgia, — and I speak of Georgia, because here my observation has been personal, — as is well known, was in 1839. At that time, from Charleston, on the Carolina coast, it found its way to Augusta, one hundred and thirty-six miles distant; and prevailed as a devastating epidemic. Active discussion, and a diligent search into the origin of the disease, as usual, immediately followed ; but a perfect immunity of fifteen years, for almost all inland localities, quieted our apprehensions and relaxed our watchfulness concerning an enemy, however formidable, yet so occasional and whilom in its visitations. Not until 1854 are we again called to deplore inland epidemics succeeding to coast incursions of yellow fever. Now, from a repetition of the distresses of 1839, we began to recognize that, under some mysterious and hidden influence, the health and security of distant rural towns were compromised by the existence of yellow fever on the coast. It was the observations made of these epidemics of 1854, and the unmistakable significance of certain occurrences of that season, plainly indicating the agency of railroad transportation in the propagation inland of the terrible scourge, that awakened interest in the subject and caused it to be introduced and discussed in the Georgia Medical Association. Hence resulted the appointment of a committee to propose measures against the inland extension of yellow fever.

Again a period of over twenty years elapses without any striking facts regarding inland transportation of yellow fever. Apprehension, and with it interest, had long since relaxed in regard to protective measures, till the Savannah epidemic of 1876. In this visitation, the tendency to invade interior communities is again recognized with even a clearer interpretation of its significance than ever before. The railroads are now distinctly and unsparingly charged as the carriers of yellow fever infection. Since then the wide-spread interest so fully awakened on the subject has been kept up, most unhappily at a frightful cost, — the startling and distressing histories of 1878 and 1879 in the stricken West, have fixed for all time our interest in whatever relates to inland quarantine. The full freshness of this interest is now upon us ; and, while we are gathered here from every section of our common country to deliberate upon every measure affecting the public health, no one question has more prominence in the minds of all, no one interest appeals more strongly to our hearts, than that which relates to yellow fever. How to keep the Destroyer hereafter from our coasts — how to prevent in the future its spread into the interior? It is with this latter question, as relating to inland quarantine, that I propose more directly to be occupied.

In the present discussion of quarantine measures bearing upon yellow fever, I must state that I am addressing those only who, like myself, hold the two following propositions as accepted and fundamental principles in regard to this disease: —

First. That the poison or product giving rise to the assemblage of phenomena and sequences which are known to constitute yellow fever is an *exotic* readily importable into this country and, after importation, transportable from one region to another.

Secondly. That yellow fever is not in any of its stages communicable from one person to another after the manner or according to the *rationale* of ordinary contagion.

Upon these two comprehensive and fundamental *assumptions*,[1] as they may be styled by some, are predicated and conditioned all the arguments I have to offer and all the suggestions I have to make in the brief period allowed me for these remarks on quarantine. To such of our brethren as deny or disbelieve these propositions, with all due respect for their opinions, I can but say that this discussion is not, in any part, addressed to them. The two platforms on which we severally stand, and the two spheres of thought in which we reason, are so diverse and irreconcilable, that argument — even did we have the time or were this the occasion — would not in the least avail. Unhappily, we cannot "take counsel together."

I would not here presume to discuss the present question of inland quarantine, except for the belief, that, by an incomparable majority, sanitarians of the largest observation and experience, as well as those most profound in all the science pertaining to the subject, will fully recognize the legitimacy of the grounds from which, as from a common point of departure, our discussion will proceed. In whatever else we may differ, these three tenets we hold in common: The importability of yellow fever from foreign countries; the transportability of yellow fever from one community to another in this country; and, lastly, the non-transmissibility of yellow fever by contagion from one individual to another. Assuming then, as I have said, that these three attributes are almost universally admitted as inherent to the nature of yellow fever, it may not be unprofitable to examine somewhat carefully into the quarantine measures as at present carried out, in order that we may determine to what extent they will be found to be based upon these important and fundamental characteristics of the disease.

Detention of Ships and Cargoes in Quarantine — The Detention of Passengers and Persons with the Ships and their Cargoes.

No one can deny that the system as exemplified in our coast quarantine for preventing the importation of yellow fever fully recognizes the importability of the disease; nor can any one deny — whatever may have been its failures — that this system is energetically and faithfully carried out, nor can it be questioned that it is most *rational* in all that pertains to the cargo and other contents of the vessel and to the ship-air and to the ship itself.

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[1] The points here stated have been already argued in former papers by myself and others.

But who can fail to see that the detention of the passengers on board this infected ship during the "days of observation," however many they may be, is a total ignoring of the admitted fact of non-contagion in which the interests and the *rights* of these passengers are most *irrationally* compromised. If we hold, as we all do, that the air of the ship, that its cargo and other contents, embody yellow fever poison, capable of infecting all who imbibe it, we rightly and rationally detain such vessel and cargo at a safe distance out of the healthy city and exclude its citizens from coming in near proximity to them to save them from taking the disease. But why detain these passengers after their voyage who have been so long on board, whether they have resisted the influence of the pestiferous air, on the one hand, or have become already affected by it on the other, as shown by symptoms of yellow fever? The answer is well known to us all, — it is an answer that was spoken in a bygone age, — it is entirely traditional, and, more than that, given to us in the language of an acknowledged and an exploded error: "They are kept under observation from the fear, that having the 'seeds' of the poison, or, if you please, the 'germs' of the disease in their blood, they may develop yellow fever and infect the community of the port and through it the entire country." Let me here ask, Has not the knowledge and science of the present day made here any advance beyond the traditions of the past? Does the answer accord strictly or even loosely with the laws we recognize as governing the propagation of yellow fever in the present day? Do we not deny most positively that personal contagion is one of its attributes in any stage or condition of its development? And yet we could not exercise any more exacting or stringent measures against small-pox, the most contagious of all diseases, than we do at present against yellow fever, to which we totally deny the attribute of personal contagion! Could isolation and exclusion under the direst "casting out" of the leper or the plague, have been more peremptory and complete than that which we now sanction in this advanced age of sanitary science for *non-contagious* yellow fever!

The Quarantine of the Present. — No Refuge or Passport for Persons, though Non-infectious. — No Quarantine for Trains and Freight though filled with Infectious and Propagating Germs.

When we would interrogate, however briefly, the method of quarantine supervision exercised over railroads and other lines of inbound travel and transportation — except in a few rare instances — we must be struck with the still greater inconsistency, indeed the direct *contradiction*, that practice gives to faith and to principle. Here, in most instances, the person from the infected town, or even *said* to be from any infected locality, though he has no signs of disease upon him, and who, even though he had yellow fever in its most virulent form, could not, according to our widely disseminated opinions, communicate it, I say we exclude such persons, while we have allowed the train of cars filled with the air of infected cities and with porous freight also permeated with such air, to pass in and through, without a challenge!

In our inland quarantine then, it is seen that we violate most palpably, not only one, but two of our three fundamental principles, for we not only ignore the non-contagiousness of yellow fever and impose on exposed persons a cruel exclusion or a more cruel immuring in an infected locality, subjecting them to a rigor as severe as in the case of small-pox, but we ignore and negative the transportability of the yellow fever germ and allow it to be carried into the healthy city or town by car-loads and trunk-loads. Without reflection, with no deliberate circumspection or comparison, we are blindly guided by the terrible traditions of the past. From the early days when leprosy and plague were the objects against which edicts of isolation were fulminated to the present time, the infected *person* or the subject of the disease has ever been the chief object against which these enactments were directed :—

"'Room for the Leper! Room!' And as he came
The cry passed on 'Room for the Leper! Room!'

. . . .

"Depart! and come not near
The busy mart, the crowded city, more;
Nor set thy foot a human threshold o'er;
And stay thou not to hear
Voices that call thee in the way; and fly
From all who in the wilderness pass by.

"Wet not thy burning lip
In streams that to a human dwelling glide;
Nor rest thee where the covert fountains hide;
Nor kneel thee down to dip
The water where the pilgrim bends to drink,
By desert well or river's grassy brink;

"And pass thou not between
The weary traveler and the cooling breeze;
And lie not down to sleep beneath the trees
Where human tracks are seen;
Milk not the goat that browseth on the plain,
Nor pluck the standing corn, or yellow grain."

There is something touching and humane in the above pronouncement of the terrible Jewish edict by the priest — not so the short and plain-dealing cruelty of times far less remote, and by a people among the highest in the scale of benevolence and enlightenment. Dr. Andrew Fergus, in a late address before the British Medical Association, is said[1] to relate the following as a relic of the past. Its hardness is by no means softened by the hard old Scotch in which it is indited: —

"In May, 1585, the authorities of Aberdeen built ports to prevent the entrance of people who might bring the infection. Gibbets were erected, 'one at the nearest cross, one other at the brig of Dee, and the third at Haven Mouth, that in case any infectit person arrive or repair by sea or land to this brough, or in case ony indweller of this brough receive, house, or harbour, or give meat or drink to the infectit person or persons, *the man to be hangit* and *the woman to be drownit.*'"

Dreadful as may appear to us such enactments and such doings, are not some of us cognizant of a spirit of dread and horror — all unfounded as it was — which pervaded the inhabitants of some of the towns and cities of this country in the recent past in regard to the subjects of yellow fever, and even in regard to refugees from yellow fever districts, though perfectly well? I mean the wild alarm of the populace, and even of authorities of towns, that appeared to justify the suggestion of tearing up railroad tracks, and which, so far as I know, then furnished a new phrase and a ruthless and dreadful idea of modern sanitation, — "Shot-gun quarantine!" — all having their origin in tradition, and in the association of non-contagious yellow fever with contagious small-pox and plague and other personally contagious diseases.

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[1] *North Carolina Medical Journal*, September, 1879, p. 216.

It will be admitted, I suppose, by every one, that the establishment of the system of isolation and exclusion in regard to the subjects of small-pox and the contagious exanthemata, universally observed, has been based upon the scientific indorsement of a common observation of the unmistakable facts in regard to their constant transmission from individual to individual and from one community to another by persons and fomites. Let me now most respectfully ask, does the quarantine which we at present maintain against yellow fever, or tacitly indorse, if we do not establish by sanitary edicts, as Health Officers and Sanitary Commissioners, does this quarantine, I say, accord with our scientific observations and with the conscientious convictions of the majority of the profession, in regard to the capability of its transmission from person to person, or with our *denial* that a case of yellow fever *per se*, — independent of trunks or infected clothing, or other porous goods, — independently of germ-bearing *air*, can originate the disease in any locality healthy or unhealthy, favorable or unfavorable, to its propagation? Practice here certainly violates the convictions of science, if not the intuitions of common sense.

Let us see, when I state my own firm belief in regard to the transmission of yellow fever poison — whether it be "germ," or "spore," or "gaseous emanation," or "dynamic force," — that it is an exotic or imported poison contained largely in the atmosphere of infected places, capable of permeating and remaining in porous, and perhaps solid, substances, converting them into fomites, that this germ-bearing air or these fomites are capable of carrying from place to place, and of communicating the infection to persons, and of infecting the entire atmosphere of communities, I feel quite confident that I enunciate the belief of a majority — of perhaps an incomparable majority — of those who have devoted the largest amount of earnest study to the subject.

And secondly, when I state my conviction, that this atmospheric poison having entered the human blood or system, though producing its characteristic phenomena in the individual imbibing it, is not capable, after the manner of a contagion, of giving rise to similar phenomena in other individuals coming in contact with the subject, nor of infecting the atmosphere of uninvaded communities, I think I may still say that I express the convictions of a very large majority of sanitarians.

The majority holding to the terms of the second proposition may not be so large or so nearly universal as that holding to the transportability of the yellow fever germ; but it is a wide-spread conviction, among perhaps the most noted and *influential* sanitarians of the present day, that the inception and propagation of yellow fever is *not by contagion* in any identical or analogous acceptation of the term, as we apply it to small-pox, scarlatina, diphtheria, measles, and other diseases against which we establish the quarantine of isolation and exclusion.

I have used here with emphasis, the term *influential* sanitarians, to indicate the force of the opinions of such scientists in forming and controlling the convictions of the non-professional communities upon which such opinions are to bear in the vital matter of yellow fever quarantine. The people look now trustingly to the rational and consistent decisions of the guardians of the public health and accept them as the fiat of their fate. Let me here ask, Will this proper and wholesome submission to authority long continue under the present inconsonance between theory and practice under which the yellow fever quarantine is at present conducted? Is our present conduct of this quarantine at all modified by the firm convictions that possess us, or in accordance with the confident and decided opinions we give broadcast to communities? Have we, in any instance, lightened the burdens or ameliorated the horrors consequent upon the operation of the law, which shuts out from escape and inexorably denies refuge to valuable men, to beloved women, and tender children, who would save themselves by fleeing from the devastating pestilence? Have we, in a single instance, as yet, allowed humanity, or pity, or consideration, or reason, or even our own firm convictions of the non-contagious character of the disease, to influence us in behalf of the unfortunate inhabitants of the infected city who have not had the prophetic foresight to precipitate departure in time to anticipate the undiscriminating quarantine which suddenly blocks the way to their escape?

Under the influence of principles which are *not our* principles, one city quarantines against her unfortunate sister city. She may lie directly in the pathway of the life-saving *hegira* of the fleeing community seeking refuge from death, — a *cordon sanitaire*, such as at one time hemmed in the cholera and the plague, forbids their flight; for not only refuge but even passport through the neighboring towns and cities is denied them. They must remain in or return to their infected homes to breathe again the germ-laden atmosphere, to increase the pestilence, and swell the daily bills of yellow fever mortality.

All this madness is enacted under a superficial and most erroneous interpretation of the opinions of sanitarians, as to the communicability of yellow fever from person to person. Thus did "shot-gun quarantine" find its origin, and upon this same platform has "mob law" more than once come forth to rule the hour!

DEPOPULATION OF THE INFECTED CITIES.

The national and local sanitary authorities counselling with the officers of the Howard Association, at Memphis, wisely proposed, and to a large extent attempted, the thinning of the population, or the depopulation of the city, as a measure for controlling the epidemic and lessening the mortality. Until personal quarantine has been abandoned, until refugees are no longer recognized as *foci* of contagion, depopulation becomes a dead letter in our efforts to combat yellow fever. Few cities liable to yellow fever are so happily circumstanced that any material depopulation can be accomplished in a reasonable time after the declaring of the epidemic. In most localities invaded by yellow fever no place of safety is to be found sufficiently near at hand, for any considerable *moiety* of the population to take immediate refuge, — the suburbs and even the vicinities for a considerable area are often themselves within the range, and submerged in the germ-laden atmosphere. Few of them are so fortunately situated as Augusta, Ga., where, in the two epidemics of 1839 and 1854, twelve hours did not elapse after the declaration of the epidemic, ere, as we may almost literally assert, the entire white population[1] had removed to a safe distance out of the limits of the infected atmosphere ; the sandhills on both sides of the Savannah, the camp ground, and the piny woods affording ready and ample accommodation for all.

For most cities, then, the present personal quarantine, as long as it is recognized, must be an effectual and fatal *bar* to the measure of depopulation. Only in a flight by railroads generally, to localities more or less remote, and in communities alarmed and excited, and *cordoned* and bristling with quarantine prohibitions against every person who can even be *suspected* of having come out of the infected locality, can they possibly seek refuge. Better take the risk of yellow fever in our own homes, with the loving hands of friends to smooth our pillows, or tenderly to close our eyes, than to suffer and perish, outcasts by the wayside, in sight of the inhospitable and garrisoned households of fear-stricken strangers!

Until we establish some system of inland quarantine which, in its carrying out, practically and fully recognizes that which nearly all sanitarians firmly hold to as an established principle, namely, the non-communicability of yellow fever by the infected person to other persons and to communities, we cannot expect anything from the efforts at depopulation. The details of such a system may be difficult, — perhaps expensive and awkward of execution, but I think it probable that a careful consideration of the subject would demonstrate that they are by no means impracticable or at all beyond the reach of a most thorough and effectual accomplishment. The personal inland quarantine, which we at present indorse, and which is conducted under our authority as sanitarians and public health officers, is a complete stultification of our own teachings. It is the quarantine for plague, for small-pox, for cholera, for leprosy, but *not* for yellow fever ; we must either change the teaching and declare yellow fever intensely contagious, like small-pox, plague, and scarlatina, or we must modify the quarantine and adjust it to the principles we profess.

If, as we hold, yellow fever is not contagious, who will deny our being able so to systematize our surveillance of all railroads and other avenues of travel, and of persons seeking refuge, in such a manner as to render their entrance and remaining in healthy cities, their being seized there with the disease, being nursed there and dying there, perfectly harmless to other individuals and to the sanitary interests of communities. Centuries of observation and thousands of experiences have fully demonstrated the harmlessness of the infected taking such refuge and enjoying such hospitality and privileges. Time there was, and not a very distant time, when cases of yellow fever were scattered about in every inland city and town and village that could be reached by the flying citizens of the coast. Yellow fever then was dreaded as much as now, but I really believe it was better understood by even the common people than we doctors understand it now. Noon does not seem to have improved upon the early light of dawn. I say the disease was greatly dreaded. Incursions from the coast were looked for in alarm, but no one ever thought then of any refugee or exposed person or imported case producing a second case, much less an epidemic. The announcement of a case of yellow fever would produce always some anxiety, till the one all-important question could be answered : "Did the case *originate* here?" If not, but found to be an "imported case," no more thought or concern was given to the matter. The confident assurance was enjoyed that the poison itself of yellow fever had not yet made its way to our city, but only some one who had imbibed the poison elsewhere, and was suffering from its effects. In no single case was this happy confidence ever disappointed or this logical train of reasoning ever brought in question by an extension of the disease. This single case or others of a like history might be protracted to any extent, or they might die of black vomit surrounded by their friends in the most densely populated parts of the city, and yet no alarm arose among the citizens, no stampeding of families, and entertainment still was accorded to the strangers sick or well.

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[1] The colored people were little or not at all liable in these epidemics.

Looking then into the history of the past, and comparing it with the present tone of public feeling towards refugee cases of yellow fever in healthy inland communities, we cannot fail to discover a most marked and contrasting change. Instead of the welcome and refuge and nursing and tender care extended in the past, all travelers during the season of an epidemic, however distant, have become now by statute — by sanitary statute — objects of suspicion marked for exclusion unless they can purge themselves of the abhorred *taint* of having come out of the infected region, while any one so unfortunate as to be attacked with the disease in his flight had better die by the wayside than be allowed to enter and diffuse poison in the pure atmosphere of a healthy town.

Let me here ask what has given such frightful significance to cases once regarded so innocent and harmless? I will endeavor to give an answer to this question : First among the causes which have produced this change is the fact that yellow fever, at each one of its coast visitations, for more than the past twenty years, has been found to make incursions into the interior and to produce inland epidemics in the same cities where formerly refugee cases had been devoid of evil. The explanation of these incursions have been fully dwelt upon[1] in our former discussions of the transportation of

[1] "The Railroad Transportation of Disease-germs," *Second Report of Board of Health*

disease-germs. It is unnecessary here to discuss the question at length; to place, however, in a strong light these two conditions of public and professional sentiment will be but presenting in condensed form the entire problem I am attempting to solve. The experimental demonstration necessary to its solution will be seen to have been already made while the precept evolved from it is too plain to be misapprehended and too imperative to be disregarded.

Both the propositions announced in the beginning of the present paper are fully established by this simple comparison: —

First, that the yellow fever refugee, from the coast or elsewhere, traveling slowly, as in times past, by stage or private conveyance, with comparatively little baggage, though he brings with him in his blood a full supply of yellow fever germs or poison sufficient to produce in him all its phenomena, and among them black vomit and death, has never been known, whether he was overtaken by the wayside, in the pine woods, or in the crowded city, to communicate the disease to others, or to infect the air of the inland community in which he had fallen.

While, *secondly*, the yellow fever refugee of the present time, coming in the rapid transit of a few hours by railroad, and bringing with him often the largest Saratoga trunks of porous baggage that had been packed and closed in the infected atmosphere, has brought with him, besides the germs circulating in his own veins, — proved to be innocuous to all but himself, — he has, I say, besides these blood-germs, brought with him a vast multitude of propagating *atmospheric* germs, in all their activity and capacity, to poison all who may directly imbibe them, and to rapidly propagate poison in the atmosphere of the entire locality.

In the first case the ventilation incident to several days of travel had removed from his scanty baggage and wearing apparel, probably, all yellow fever germs that were capable of communicating disease; only the poison which he carried in his own blood remained, and this could infect no other person nor poison the air. In the case of the modern or railroad traveler, the immense volumes of germ-laden air in the passenger train, and still more in the boxed-up freight cars, besides what is brought in the trunks, must inevitably insure widespread atmospheric infection, and a widespread epidemic. Even though the air of the invaded locality may be what is called "pure," it cannot often escape vitiation; when it may be what is called "foul," propagation and an epidemic are simply *inevitable.*

OUR FUTURE QUARANTINE.

Let us, then, after anxiously interrogating and rationally interpreting the oracles of the past, implicitly follow the unmistakable precepts we have elicited. Let us so modify our quarantine that the refugee from a region affected with yellow fever, though he carry with him in his blood, as he did formerly, his own fatal dose of disease-germs, shall not bring with him, outside of his own veins, any atmospheric propagating germs. Experience has

of the State of Georgia, 1876, p. 132. Also "The Yellow Fever Germ on Coast and Inland," *Transactions of the Medical Association of Georgia*, 1879, p. 119.

shown that only these last are capable of producing either an individual case or an epidemic.

Quarantine, in its widest sense as well as in its last analysis, means sanitary dealing with disease-poisons. So long as this dealing is based on rational principles, comprehending and recognizing all the attributes of the particular poisons dealt with, burdensome as they may be, all its mandates and all its measures secure respect and the most implicit obedience; but where, as we have said, practice continues to contradict a widely-acknowledged principle, suspicion, disrespect, and insubordination must everywhere obstruct its intended benefits. The quarantine just now urged recognizes the two prominent and widely-acknowledged principles regarding yellow fever: namely, the extreme transmissibility and receptibility of the atmospheric germ, and the entire absence of contagion in the subject. When these two conditions are fully met such a quarantine can be defended on principle, as I believe it will be vindicated by the happiest result. This is the quarantine which carried out in all its details will be acceptable because reasonable, this, I say, must inevitably become the Yellow Fever Quarantine of the Future.

OUTLINE.

The outline of quarantine measures, such as is here proposed, has been made either directly by myself, or through the discussion and sometimes approval of others,[1] more or less familiar to the members of this Association.

First. Allow no railroad train or car, whether for passengers or freight, coming from an infected locality to approach within many miles of any healthy or uninfected town or city.

Secondly. Meet these trains, at some undoubtedly safe distance from their place of destination, by fresh cars for both passengers and freight.

Third. A careful and discriminating surveillance to be maintained over the baggage of passengers and over the freight in order to determine what will be *safe*, after ventilation and other means of disinfection, to be taken on the fresh cars. Porous articles and closed trunks being most objectionable till disinfected.

Fourth. That passengers have free passport into, and refuge in, any city, town, village, or other community, *without hindrance* on account of their physical condition, in relation to their supposed or manifested inception of yellow fever poison. Long exposure in yellow fever atmosphere, attendance on the sick, actual fever and black vomit should be no bar or hindrance, on account of infection, to the free passage of persons seeking refuge for themselves and families from yellow fever.

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[1] See "Report on the Prevention of Yellow Fever in Nashville during the Epidemic of 1878," by J. Berrien Lindsley, R. M. D., Health Officer, *Report No. 3 Board of Health of Nashville, Tennessee*, pp. 290–344. Nashville, 1879.

Also "Report on advances in Hygiene and Public Health," by L. S. Joynes, M. D., Richmond, Va., Secretary of the State Board of Health, etc., *Transactions Medical Society of Virginia — Virginia Medical Monthly*, January, 1878, pp. 201–243.

At a regular meeting of the Augusta Medical Society, held November 13, 1879, the subject of yellow fever being under discussion, the following resolution was unanimously adopted: —

"*Resolved:* That the yellow fever quarantine of the present time should be so modified as no longer to exclude *persons* coming from infected regions from taking refuge in healthy localities; — baggage, clothing, trunks, and boxes being strictly excluded, and every detail being minutely systematized on this principle.

A true extract from the Minutes. (Signed) A. SIBLEY CAMPBELL,
Secretary.

Fifth. To secure the privilege and benefits of the unrestricted travel contemplated by the modified quarantine, all persons must submit to such provisions as may be deemed necessary by the sanitary officers. Baths, and change of apparel may be exacted, but simple *ventilation* only will in most cases suffice.

Sixth. In the establishment of a modified quarantine on the above systematized method, arrangements on the most liberal and enlightened scale will be required. Officers of intelligence and high character only should be appointed to superintend and carry out the details of the plan. Whether buildings temporary or permanent will be required, and whether municipal, state, or national sanitary authorities are best to have charge of its conduct, only experience in an untried method can determine. An efficient and easy-working system can only gradually and by slow progress be perfected.

Dr. J. Berrien Lindsley, the distinguished and efficient Health Officer of Nashville, in a valuable and most suggestive report, entitled "Nashville in the Epidemic of 1878,"[1] says, "The multiplied facts of the recent epidemic give the utmost confirmation to Dr. Campbell's views. Under similar circumstances I would unhesitatingly resort to the same rigid quarantine of things as contra-distinguished to persons." Dr. Lindsley, in the same valuable report, makes a most important suggestion bearing upon the railroad transportation of the yellow fever poison of whatever nature it may be: "One important improvement should be added at the very outset of an epidemic. No upholstery should be allowed in passenger cars. They should be furnished with polished wooden seats. Such cars can be readily disinfected."

The sketch just presented is intended to foreshadow in comprehensive outline the more or less complicated details of an inland quarantine for yellow fever, modified and adjusted to the principles we, as sanitarians, hold in regard, first, to the fearfully ready transportability of the infection; and, secondly, to its entire non-contagion. Such being our faith, the merciful boon of free passport and refuge cannot much longer be denied to those who look to us for relief. Our decisions in this case carry with them most truly "the issues to them, of life and death." Even should much complication of machinery, and the expenditure of a considerable amount of the public funds, attend its elaboration and the attainment of its effectual establishment, it will not equal the losses now sustained by the people in the tyrannical interruption of travel, the complete nullifying of commerce proclaimed on account of yellow fever, from the beginning to the end of every epidemic.

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[1] *Third Report of the Board of Health for the City of Nashville, for the Two Years ending December 31, 1878,* page 314. Nashville, 1879.

And much less is the expenditure to be considered in comparison with the loss of life, the desolation of homes and of hearts, which every year result from the denial of refuge, the immuring in infected cities among the dying and the dead, and the cruel "casting out" from all places of resort on the slightest suspicion of that *falsest of all assumptions*, yellow fever contagion.

The expenses incident to the carrying out of the present incongruous and absurd quarantine, — entirely irreconcilable with the principles we profess and the doctrines we teach, — no doubt fully equal all that the modified quarantine would cost, after it may have once been accepted and properly organized. The newly gotten-up alarm which now fills every community on the approach of any case of yellow fever will, under the practical demonstration given by the health authorities, soon give place to the common sense and common humanity of former days; while denial of refuge, casting out, and shot-gun quarantine will be remembered with only tears and a blush as frightful frenzies of the past.

As to the simplicity and inexpensiveness of the system now proposed, I almost hesitate to give here an estimate so low as that I have held. The modern developments in regard to disinfection, and the principles enunciated as based upon them, have to a great extent cast into the shade of oblivion a means of purification universally held, until recently, in the strongest confidence and reliance. Freezing, steaming, and the diffusion of atomized chemical *germicides*, have caused us greatly to forget the trust we so long had given to *thorough ventilation* in *fresh and healthy air* as a disinfectant, not only in the case of germs, but even where the virus of the most contagious diseases was to be combatted. What other disinfectant do we practically now depend upon for the protection of families, when, as physicians, we go from the bedside of scarlatina, of diphtheria, and measles, but the *airing* of our clothes in passing from house to house? And it is known how seldom medical men carry infection in their daily rounds of attendance. This, we can all remember, must have been the great disinfectant which, in the slow-going days of stages and coaches, and private travel, so purified the refugee from all atmospheric propagating germs, allowing only the germs in his blood — injurious to none others — to come with him from the coast. May I venture to express my belief? It is this, that exposure of the clothing, and, when practicable, the goods and trunks, on the outside of the cars, or upon platform cars during the rapid passage through the pure air for over twenty miles or more on the railroad, carrying them backward and forward if necessary, would alone, without the aid of *germicides*, sufficiently disinfect these fomites to render them safe and innocuous when carried into a city. My simple plan would be, then, to divest the refugee of the clothes he has worn out of the infected city, and, clothing him in a fresh suit, *lent to him at quarantine*, allow him to go to his destination, even though stricken or dying with yellow fever. Then, after ventilating his own clothes and all that the trunk contained, and the trunk itself, by hanging them from the outside of the train for many miles, to send them promptly after him, with the smallest possible delay.

I have thus, Mr. President and Gentlemen of the American Public Health

Association, considered, as briefly as I could, the defects, as I regard them, of our inland system of yellow fever quarantine, and have endeavored to answer, not for the first time, the question given me nearly twenty-five years ago: "Are there any means by which the extension of yellow fever into the interior may be prevented?" The answer I have given to this momentous question may be inadequate; the details of the plan I have outlined are most probably defective in some particulars, whilst they are redundant and impracticable in others; but in regard to the *Principles* upon which this plan is based, and as to the necessity of recognizing these principles in any system hereafter to be adopted, I am most faithfully and profoundly convinced. Without further elaboration or remark, I can but humbly hope that these principles, so firmly held by us all, will be allowed to underlie our determinations, and consistently to control us in establishing the Yellow Fever Quarantine of the Future.

XVIII.

INTERNATIONAL QUARANTINE.

PRESENTED AT THE SEVENTH ANNUAL MEETING, NASHVILLE, TENN., NOVEMBER 21, 1879.

By BUSHROD W. JAMES, M. D.,
Philadelphia, Pa.

UNDER points to be especially considered by the American Public Health Association the second, "*How to prevent the importation of a first case*," is particularly an important one, and one upon which hinges the outgrowth and spread of almost all the devastating epidemics of disease, and of yellow fever, most certainly.

The very best plan, no doubt, is for every country to prevent the landing upon its shores, or the transfer within its borders, of any case of epidemic disease, or of any exposed persons until after full and ample time for the longest known period of incubation has elapsed.

The same precautions to be observed in regard to fomites of every kind and the proper disinfection of them, or even their destruction if any doubt about their complete immunity from communicating disease exists.

Let every nation be responsible for its own epidemics by well regulated international laws, and thus put the onus not upon all other countries, to keep out these marching foes of commerce and humanity, but upon the government within whose territory they may originate or break out, and thereby insure a more efficient guardianship than at present exists. While this method may seem severe for a nation during the progress of an epidemic within its possessions, yet the same government will appreciate the benefits of an international system of quarantining, when a neighboring government thus prevents a pestilence from extending, so that in a series of years every civilized nation will reap the advantage of a judicious system such as here suggested.

The lazaretto systems of our country, Great Britain, and some other countries, are improvements over those in existence during the last century, but they are far from being perfect; and now, while the public mind is awake to the subject, is the proper time for a general reform on the part of every commercial nation. Not only should they investigate the defects in their lazaretto and quarantine laws, but also by a mutual compact, adopt measures that will insure the entire world from the spread of these infectious diseases.

The imperfections of many of the present state and local enactments require judicious revision, so that the sick may avoid any cruelty, and may also have the best treatment possible for their recovery on board all vessels as well as in all land hospitals, and legislation should protect equally crews and passengers.

Many points of a commercial character are necessarily to be considered. An important one is the return of an infected vessel to its port of departure, when an epidemic breaks out upon it while on its passage, if only a few days out; or an isolation of cases on a floating hospital ship at the expense of the nation, should the vessel reach or nearly reach its destined port before a contagion exhibits itself. All expense and damage resulting to an innocent nation should be fostered by the government offending.

Detention at comfortable quarantine rooms on the border of land entrances to a country, to be established on the side where the epidemic is prevalent, is another point to be considered.

The reward of merchants and insurance companies for losses sustained in the destruction of quarantine goods that may be destroyed by reason of their becoming infected.

The embarrassments that are likely to result to commerce and the restrictions that are thrown around healthy persons that have not been exposed to the epidemic, as well as the rigid enforcement of quarantine upon all who may have been exposed.

I present this subject in a brief way, in order to arouse the attention of this body to the importance of weighing the matter of rendering more efficient our quarantine mode of protection, by either remodeling the present system the world over, or establishing new methods, by which all nations and all places shall be equally protected with a new code of international regulations and laws; and also, to so organize the quarantine stations that each government will be responsible; and no epidemic can possibly escape beyond the country of its origin without the grossest neglect of duty.

The arguments in favor of an international system of quarantine, I will consider at a future time, and will allow it to suffice if the subject can be considered, looked carefully into, and discussed, and some official action taken by this Association.

If deemed expedient, I trust it will urge our government to take the initiative towards a conference of national delegates of sanitarians from every country willing to take part, to adopt measures for the sanction of nations in the matter of international quarantine.

It is not a mere unofficial sanitary convention from different nations that I suggest, but an authoritative assemblage of delegates from every maritime nation of the world, for the purpose of making a uniform set of international laws, which all the nations can adopt for the protection of their citizens against the inroad of these scourges.

XIX.

ETIOLOGY OF YELLOW FEVER, WITH REMARKS ON QUARANTINE.

PRESENTED AT THE SEVENTH ANNUAL MEETING, NASHVILLE, TENN., NOVEMBER 20, 1877.

By T. J. TYNER, M. D.,
Of Memphis, Tenn.

I BELIEVE yellow fever originates in Memphis and other cities of America *de novo.* Or admitting, for the sake of argument, that it is exotic, I believe its spread to be absolutely dependent upon some local condition, without which it is impossible of reproduction.

Such have been my views for several years. The epidemic of 1879 has not only strengthened, but I believe fully verified those views. The proof of importation, this epidemic (1879), is so questionable, while that of local origin is so positive, that eight tenths of the profession and laity are in accord with that opinion. Memphis suffered the ravages of her first epidemic in 1855. If importation was alone sufficient, why did it not appear there sooner? The same commercial and other relations existed with New Orleans in previous years. That there never was an epidemic in New Orleans, without more or less cases of yellow fever coming here and dying here, there is no question. For the most part they were conveyed from a steamer through the streets to the City Hospital. Many, however, went to private residences. One of our oldest and most worthy physicians informs me that he has personally known as many as twelve and fifteen cases of yellow fever brought here from New Orleans in one summer. All of our oldest citizens, both in and out of the profession, are familiar with those facts. It never spread then; such cases were taken no notice of by the people. They felt perfectly secure in the delusion that the altitude of Memphis was above the reach of yellow fever. The question most naturally follows, why did the poison end with the death or recovery of the individual? Why did an excess of the poison then fail to infect a single individual (although no precautions were taken) when the insignificant amount, brought in a bunch of fruit, will now infect the entire city? To my mind there is but one answer. The local conditions which exist now and favor its spread, did not exist then. The above facts hold good as to the history of the disease in Baton Rouge, Port Hudson, Vicksburg, Meridian, Canton, Grenada, and even New Orleans. All of those places had communication with infected ports, and numbers of cases of the disease had been brought in their midst years and years before their inhabitants became susceptible to an attack.

Whatever the cause that produces the disease may be, I believe it to be cumulative. The proof is, the length of time before the inhabitants became susceptible, and the interval between each epidemic, until now it occurs two consecutive years. Further, the disease has not only become more malignant, but more general through the city. For instance, the first two epidemics were distinctly localized, never going beyond certain limits. The third was more general, and the last two infected the entire city, and even the suburbs.

A few remarks here on quarantine I hope will not be irrelevant. The first quarantine in New Orleans was established in 1821, continuing four years, when it was abandoned, proving as it did ineffectual, for the disease returned in 1822, and again as an epidemic in 1824, although not so severe. According to the history of quarantine in New Orleans, it has been enforced altogether twenty-three (23) years; the fever being there each year except 1861. Five of these were epidemic years. In these twenty-three years are included those in which the city was occupied by the United States army and navy, by which an absolute and impregnable quarantine was rigidly maintained; yet there were cases of yellow fever every year, with the probability that the absence of epidemics was due to the most perfect system of sanitation.

In 1878, when yellow fever made its appearance in New Orleans, Memphis established quarantine, the details of which are unnecessary. However, a man from New Orleans was landed on the Arkansas shore, and after a few days made his way to this city, was taken sick on the 3d of August, and sent to the hospital. His case proved to be yellow fever, and he was sent to quarantine, where he died. I mention this case, as it was the only one known to be from New Orleans. It is a notable fact that no one at the hospital contracted the disease from this man. The next case officially reported was Kate Bionda, 216 Front Street, taken ill on the 8th of August, and died on the 13th. McConnell, 448 Poplar Street, was taken the same day, and died same day (13th) with black vomit. These cases were fully one mile apart. These were the first cases that created any alarm; but, on August 6th, Colonel Turner and son, 179 Second Street, were taken ill. Both had black vomit. The son died, but the father recovered. In the alley in the rear of the above residence a negro woman died late in July with what was believed to be yellow fever. In the latter part of July there were many sudden and suspicious deaths. One in my practice, Delia Wright, 116 Promenade Street, died on the 6th of August, and was only sick about sixty hours. She died within a few hours from the time I first saw her, and I reported the cause of death unknown. From 28th of July to 7th of August there were reported at the Board of Health fourteen deaths from congestive and malarial fever, a number never occurring in the same length of time before, most of which were afterwards conceded by their attending physicians to be yellow fever. Thus it is shown that there were deaths from yellow fever prior to the imported case. For the truth of the above statement I refer to three fourths of the physicians of Memphis.

Almost simultaneous with the Bionda and McConnell cases the disease spread with wonderful rapidity, and in ten days (23d) it was officially declared epidemic. Quarantine was then abandoned, and people came to and left the city at will.

This year (1879) there being no fever anywhere on the continent, no quarantine was enforced. The summer was mild and seemingly propitious, and no fears were entertained until the 9th of July, when the whole city was thrown into the wildest state of excitement by the promulgation of the Mulbraden case, which was confirmed by *post mortem.* The Ray and Tobin cases occurred about the same time. So unprecedented was the exodus that within a few days nearly the entire white population had fled, probably not fifteen hundred unacclimated remaining. After these cases none others occurred for several days. The excitement subsided, and many of those who had gone were on the eve of returning, when the Hester family was reported. Then the unprecedented flight began again.

Those who advocate the theory of importation claim that in 1878, without quarantine the disease spread, whereas, in 1879, with quarantine it did not. The facts, I think, are these. If you will allow the expression, 1878 was essentially an epidemic year. The heat was intense and long-continued. The disease was not recognized until it had been here some time, and the exodus was not so rapid nor complete as in 1879. The suburbs and surrounding country were crowded, as were the adjacent towns. In 1879 the disease was recognized at its very first appearance; depopulation was much more thorough and rapid, and the suburbs and adjacent towns were not resorted to at all. The weather was unusually mild (cool), the mean temperature being about seven degrees lower than in 1878. Another fact which to me seems conclusive: there is scarcely a road leading out of Memphis on which the fever did not exist, and that, too, outside of the picket lines. I myself treated cases outside the lines on the Randolph, Raleigh, and Hern Lake roads. Notwithstanding quarantine, there were the amplest opportunities for conveying the disease to other places. In other words, there was not a day during the entire siege that more or less people did not leave the city. This is not said as a reflection on those whose duty it was to enforce the quarantine laws, but from the fact that an impenetrable quarantine is impossible without martial law. Another fact which I should have mentioned above, goes far to prove that the disease had no tendency to spread outside the city and suburbs. Dr. Abercrombie, who had the medical charge of Camp Marks, informed me that there were twelve cases of yellow fever at camps, every one of which contracted the disease in the city; that is, were taken from three to seven days after going into camps, and not a single case occurred with those who had been there longer than seven days. He also informed me that there were visitors from the city frequently. On Sundays many came out, showing that something more than intercourse with an infected place is requisite.

I will now refer to a part of my subject that is humiliating to every citizen of Memphis, although every city on the globe has had the same experience until the exigencies of the case compelled a change. I speak of soil pollution and privy vaults. There is an old city ordinance still in operation which is very defective. For instance, it says, whenever a privy vault is filled within three feet of the surface it must be emptied. The result in many instances is that only enough is taken out to evade the law; the vault being fifty to sixty feet deep, as many are of that depth. Another plan has been resorted to called honey-combing, that is, a new pit is dug by the old one so close that they merge into one. Owing to such a total disregard of cleanliness there are privy vaults in Memphis in which have accumulated excreta and even kitchen offal for from ten to forty years.

The cisterns are another source of offense. It is estimated by those whose business it is to know, that eight out of ten are pervious to water. For the most part they are built in cellars, and as a rule within from eight to twenty feet of the vaults. The soil is of a porous character and seepage is constantly going on, especially in wet weather. Owing to this seepage the vaults and cisterns are brought in communication. So unmistakably is this the case in many cisterns, that when the seep water fills one it does the other. In a word, the rise or fall in the cistern from seepage equals that in the vault. The work of emptying those vaults was suspended by the local Board of Health in May, but resumed again in June by the Auxiliary Sanitary Committee. Mulbranden's vault, Pontotock Street, was emptied on the 30th of May. The vaults in two tenement houses, with only a fence dividing them from Mulbranden's premises, were emptied on the 16th of June. In the same neighborhood vaults were emptied as late as the 27th of June. They were all emptied with buckets. You will bear in mind that Mulbranden's was the first case of yellow fever which occurred on the 4th or 5th of July, and he died on the 9th. Other members of his family were taken on the 15th, as were others in the same neighborhood. The vaults in the vicinity of Judge Ray's residence (Wellington Street) were emptied late in June; the stench from them was so offensive that windows and doors had to be closed. He and his family were taken ill about the time Mulbranden was. On the 13th the Hester family (within a stone's throw of Judge Ray) were attacked, when the disease became general through the neighborhood. On Hawley, Bradford, and other streets in that neighborhood, the vaults were emptied from 14th to 27th of June. Tobin and wife, 55 Bradford Street, sickened on the 6th and 8th of July, and both died. Chief Athys, Sen., Manassas Street, who died, was attacked on the 15th of July. Mrs. Downey was taken on the same day and recovered; but her son, daughter, and husband were taken a few days later and all died. The vault in the adjoining house to Downey was emptied late in June. After these cases the disease spread with great violence along Jones Avenue, Bradford, Hawley, Manassas, and other streets. Those three neighborhoods (Mulbranden, Ray, and Tobin) are fully one mile apart. The disease confined itself to those three localities for several weeks, spreading through the city very slowly.

In the northwestern part of the city, known as Pinch, and in Chelsea, the most northern part of the city, the vaults were emptied in February and March, and the fever did not get to either until September, or until every other part of the city had become infected. The three localities where the disease first appeared, were the only ones in which the vaults were emptied as late as June. The health officer is my authority. As I have already shown, the fever confined itself to those particular localities for several weeks.

It will not be out of place to mention that privy vaults were emptied in 1878, as late as August.

I stated previously that I believed the cause of yellow fever was cumulative. While I have no data on this point it is reasonable to suppose that previous to 1855 there was but little attention paid to privy vaults, and they never attracted serious attention until 1867, when the odorless excavation was brought in use. Owing to the great depth of these vaults, and the mild winters, the temperature never falls low enough to destroy animal life (animalculæ.) In summer the temperature cannot be high enough to create very rapid changes. I will not attempt to discuss what these changes are. At all events they must be very slow, and the process has evidently been going on for many years. When all these facts are placed side by side with the history of yellow fever in Memphis, the great number of years before it attacked the citizens, notwithstanding cases of it were brought right in her very midst, summer after summer, no quarantine being enforced against New Orleans ; the fact that the first epidemic was so mild as to create but little alarm, and that each subsequent one became more violent, the intervals between each getting shorter, until now it occurs two consecutive years, although from the first to the second it was twelve ; — I repeat when all these facts are placed side by side, I can but think there is a very close analogy, if not a direct connection.

In conclusion, I assert, if the theory of importation be correct, we are utterly helpless. No system of quarantine, save a solid phalanx of soldiers, can avail. A man can leave Havana, go via New York, and land in Memphis in five or six days. Upon the other hand, if it is dependent upon local causes (and I am as thoroughly convinced on that point as I am of my own existence), it is within our power to remove them. I repeat again, as I have for several years, that sanitation is the only safety for Memphis.

XX.

CAMPS; DEPOPULATION OF MEMPHIS; EPIDEMICS OF 1878 AND 1879.

READ AT THE SEVENTH ANNUAL MEETING, NASHVILLE, TENN., NOVEMBER 21, 1879.

By COL. JOHN F. CAMERON,
Of Memphis, Tenn.

On the appearance of yellow fever in the city of Memphis during the latter part of July, 1878, and the apprehension that a third visitation would, if in epidemic form, carry before it thousands of helpless human beings, a few more thoughtful minds suggested the practicability of establishing camps at points accessible to supplies and beyond the supposed limits of the infected atmosphere.

The government readily responded to a call for one thousand A tents; and upon their arrival, August 15, Camp Jo Williams was established four and a half miles south of the city, on the line of the Missouri and Tennessee Railroad. The site was selected for its isolated location, altitude, shade, ample springs of superior soft water, perfect drainage, and accessibility to rail communication.

The sole fault in the selection of the grounds, both in 1878 and 1879, was their proximity to the city, which rendered it impossible to prevent visitation to and from the infected districts, despite rigid rules, expulsion from camps, arrest by quarantine pickets, etc. The inhabitants entered the jaws of almost certain death, rather than forego the pleasure of a drunken debauch, plunder, or the like.

In 1879 this was in a measure obviated, as parties were arrested for violating the State quarantine law, placed in jail, or summarily dealt with. This deterred many from absenting themselves from camps, and rendered isolation more complete. The camps were laid out on three swells of ground, stretching one half mile. The tents were pitched along the crests and in regular order, many in avenues facing each other, and along the edges of slopes, whose forests ranged from eighty to one hundred and fifty feet in width. These A tents were pitched five feet apart, and numbered as are streets. The rows were designated, such as Otey Avenue, Wright Row, etc. Each ridge was laid off separately and with regularity, such as Camp Wills, Camp Retreat, etc. Families and single women were assigned to separate camps; single men, by themselves, and at sufficient distances to insure privacy. The colored people (but few in number) were by themselves. Two adults, or a family with one small child, were assigned to one tent. Such as were encumbered with trunks, sewing-machine, or home comforts, were furnished one additional tent, set up in the immediate rear of the line, sometimes back to back, opening into each other. Cook-stoves were, if owned by the refugees, set up, and covered with lumber, brush, firs etc., according to means or preferences. Persons desirous of availing themselves of the security of camp life, simply presented themselves at the depot with such baggage and kitchen furniture, as, with certain limitations, could be allowed by the officer in charge (excluding soiled bedding, feathers, etc.); such as claimed to have no means were moved from their residence by the committee of safety. On arrival at camp an officer stood ready, book and ration-ticket in hand, to assign the applicant to quarters, where drays were in attendance and *sanitary* or *work relief* in readiness to aid women and children to arrange their households. The name, age, and color of applicant were there registered; date of arrival, occupation, city residence noted; and the camp, avenue, and number of such carefully registered, One hundred persons have been settled permanently in less than one hour. The camp was governed by flexible military rules and discipline. Two military companies were quartered in Camp Jo Williams in 1878, while in 1879 a small detachment of colored State troops, relieved from the garrison in the city daily, together with an armed sanitary force, aided by one deputy United States marshal, and one deputy United States collector, to arrest sutlers and peddlers, who oftentimes destroyed the morale of the camps by infractions of the internal revenue laws. This was inaugurated in 1879, by which means the sale of intoxicating liquors was absolutely prevented in or about the camps; a deputy sheriff was also furnished, subject to the suggestion of the Superintendent of Camps. So that infractions of the law, of grave character, were summarily brought before a civil tribunal; minor infractions on the part of minors were treated by the most effective domestic medicine, administered by the officer in charge. In 1878 a pavilion hospital was erected 30 by 80, lattice sides, lined with tent cloth, plank floor, with wood fires built after nightfall on brick surfaces, four feet square, at intervals down the centre. Cots were arranged on either side. The attendants, kitchen and sexton corps were encamped round about. Hospital sink was built at very easy distance, four feet by six, three feet deep, lined with brick; iron-grate bars were adjusted across the wall, upon which a continuous fire burned; into this all excreta, washings, and refuse matter were cast, and effectually consumed. The military headquarters were pitched a few yards distant from the same. This the officer in charge deemed necessary, as the printed regulations[1] required that all persons stricken of the disease should be per force if necessary, removed on litters to the hospital. It was found necessary that the officer in authority should set an example of indifference to attack, in order to appease, so far as possible, the constant anxiety of the population under his charge.

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[1] "General Camp Rules. — The following Regulations are issued for the government of this Camp, with which every soul within its jurisdiction must cheerfully comply, or be driven from its limits: —

"Reveille will sound at 5 A. M.

"Labor Call, 6½ A. M., when the roll of paid labor will be called, and duty begin.

"Surgeon's Call will sound at 7 A. M., when all requiring medical treatment will report to Medical Headquarters.

"Police Call will sound at 9 A. M.

"Dinner Call will sound at 12 M.

"Police Call will sound at 2 P. M.

"Tattoo will sound at 9 P. M.

"Taps will sound at 10 P. M.

Especially was this true in 1878, as depopulation went on slowly that year, and infected people daily poured into the camps from the more pestilential portions of the city. Very many reached camp with the fever on them, so that as many as seventeen persons fell victims, in one night, not a few in their tents. In no instance, however, did they communicate the disease to their families or bed-fellows, so far as could be traced. The population of Camp Williams, in 1878, was maximum six hundred and fifty persons.

Taking date of impregnation (when registered) to development, the greatest length of the period of incubation was fourteen days. No instance showing infection from contact, in camps, appeared. None who remained and observed the rules, prohibiting visitations to the city, were attacked after ten to twelve days residence. Contact with the hospital, the sick, or dead, did not prove of evil, though such was prohibited, and tolerably rigidly enforced.

"At Police Call the details will fall in and be verified by the bosses, who will then march them to the portions of the Camp requiring duty.

"At Police Call the inhabitants are required to ventilate tents, clear ditches, sun straw and bedding, and police round about their quarters, kitchens, and parade.

"Families having no male adults present must police their tents and immediate surroundings. The police gangs, on application, will attend to their wants.

"The inhabitants are required to make use of the kitchen pits, into which all waste water and kitchen waste must be thrown. The sinks must be used by the inhabitants in answer to all calls of nature. A violation of this rule will subject the offender to expulsion from Camp.

"The Sanitary Officer will make the rounds at 10 A. M., and enforce these regulations. He will report to the Commandant the tenant guilty of neglect.

"All able-bodied men are required to do police duty. They will be divided into gangs, or reliefs; be assigned to duty in turn, and for no longer than one half of each day, between Reveille and Retreat.

"The Assistant Superintendent, the Quartermaster and Commissary, Bosses of Labor Gangs, and the Surgeon in charge, will make a daily report of all officers, men and women doing duty under them, and to whom ration stores and medicines are issued. The Surgeon will also report number of prescriptions, number of inhabitants sick and in hospital, and all deaths and births occurring within each twenty-four hours. These reports will be filed at headquarters by 9 P. M. of each day.

"A condensed Daily Report, in printed form, will be issued and forwarded to the Commandant of Camps at 9 P. M.

"A Weekly Report of refugees and citizens employed as laborers and mechanics will be furnished the Commandant of Camps by the Quartermaster, after receiving the signature of the Commanding Officer.

"The Senior Officer of each department will confine himself to his respective duties, and will report to the Superintendent only for instructions, details, and orders pertaining thereto. By order

JOHN F. CAMERON,
Commander and Chief of Supplies.

"MEMPHIS, Tenn., *Sept.* 1, 1879."

Number of sick, yellow fever, in this camp	186
Number of deaths	58
Average length of sickness, to dissolution	5 days.
Per cent. of mortality	36 per cent.

No relapse, the stricken ones gained strength rapidly, and moved back to their quarters in line, after a few days' convalescence.

Curious incidents, Camp Williams, 1878: Four grave-diggers, one carpenter, on constant duty at the hospital, carrying the sick, washing the bodies, sleeping on infected bedding in tents, wearing clothing stripped from the bodies of deceased, remained on said duties seven weeks with perfect immunity from attack. All went into the city, became intoxicated, remained so three days; on their return, one fell in the woods and died, two others were treated in hospital at camp and died, one escaped; none had previously had fever. Colonel Jno. F. Cameron, and the surgeon in charge, also the dispensary clerk, neither of whom had or have since been ill of yellow fever, caused a force to wash out the dead-house, line same with blankets and tent cloth, and all three occupied same the later part of the epidemic. Colonel C.'s delicate health compelled him to abandon the tent for drier apartment. They all pulled through safely.

Negroes hold doctors and hospitals in great terror, and can rarely be induced to take medicine. All removals required armed force. On one occasion the inhabitants resisted the litter carriers, — acting under instructions to remove a patient to the hospital, — and it became necessary to turn out the guard to effect a transfer. That night the patient was stolen from the hospital, and in the attempt to convey him to the city in a wagon, he died on the way.

One instance further in this connection. A negro woman secreted her husband in a small A tent, and screened him through the aid of friends round about. His sickness was not reported to the authorities, and he perished there, rather than be removed to the hospital. The same prejudice exists in a less degree among the whites, but superior intelligence warns the neighbors of the danger of infection, and the case is brought to notice.

Isolation, and disinfection by fire, were first introduced by Colonel Cameron here, in that year, 1878. Residing some four miles east of Memphis, near Buntyn Station, his home being isolated, by being situated in a large grove, he left his family, to take charge of the refugee camps, then to be established. He placed his family — wife, five children, and two servants, within the enclosure, — provisioned them for ninety days, nailed up the gates, and forbade contact with the outside world. With two exceptions, — one of Major Hastings, who followed the example, — no house escaped within a radius of five miles. In camps, the practice was to remove sick, destroy tent and contents, replace same with new, and put the family or comrade of the stricken one in new quarters. It had a good moral effect on the adjoining tents. Fire effaces all traces of former infection; the presence of these tents, even though disinfected, remained a menace to new comers, and old ones too, — none could be induced to occupy them. So with hospital bedding; when once contaminated, then burn. 'T is a fight in the dark. Fire is a known exterminator. The use of disinfectants is as yet *somewhat experimental.* Camp Williams broke up October 31, 1878. General health, good. Class of population: mechanics, tradesmen, laborers, and women of *industrious* habits, of indifferent morality, Catholics in faith, and in very many instances paupers and indigents of both class and sex. Very few worthy people inhabited the tents of Camp Williams proper; very many betook themselves to colonies, situated at convenient distances from supplies and with medical assistance near at hand. Temperature high, atmosphere light and oppressive; one continuous dry season, exceeding any year in the writer's experience. In short, the heat was intense.

Twenty-four thousand people had left the city *via* river, railroads, and dirt ways. Difficulties stood in the way of locating camps. The country people protested — north and east of us. Arkansas and Mississippi quarantined against us (and it was a wise protest effectually carried into execution, and heartily sustained to the end by a sober approving press and public sentiment) *in those two States.* Railroads feared to engage to bear refugees to a point at easy distance from the infected city. Time was lost. At last, a forlorn hope, aided by the enterprising and liberal spirited superintendent of the Mississippi and Tennessee Railroad, Major Mike Burk, the site of Camp Marks was taken possession of by armed presence. Three hundred tents, twenty thousand feet of lumber, cooking utensils, tools, carpenters, laborers, brick, oven material, masons, shovels and axes, were, on the night of the 28th of July, landed at what was afterwards known as Camp Marks. By the aid of fires and lanterns, Marks Square was laid out; two hundred tents arranged in regular order; headquarter tents, dispensary, and kitchen erected; so that by 5 P. M. of the 29th, less than twenty-four hours, the camp was ready for refugees. Eighty-one registered that day. The population increased at the rate of one hundred per day. Work for their accommodation went on, keeping pace with the influx. In five days, a large and well ventilated hospital was erected, five hundred yards distant, arranged in two compartments, male and female. The apex was built after the plan of a drying-house, lattice sides, running up four feet, with broad cone over all. Glass windows, sliding-doors, soup-house, and sanitary and sexton force in tents round about. At the same time a warehouse was completed, thirty by eighty feet, also a slaughter-house and cattle-pen. In ten days, an oven (double) with capacity to bake three thousand loaves of bread and molasses cake daily, was completed; so that in less than twelve days, every appointment necessary to the subsistence of four thousand people was at hand. Ten days' rations were issued from the warehouse in the city, and upon morning report (see form appended),[1] these were stored at camp warehouse, from which issues were made every other day, excepting bread, which was issued daily. Each tent or family was supplied with a ration ticket; all over eight years of age were classed adult, under eight years, half rations. The inhabitants, at the sound of the bugle, presented themselves, with buckets and sacks in hand, and took position in file, poles being rigged so as to form a narrow avenue to the distributing hands. The sexes alternated: one day the females took precedence, next the men; the women for the most part being of the semi-masculine type of the gentler sex, the Superintendent directed that the usual deference should not prevail. The table was eighteen feet long, behind which the different provisions for issue were placed successively from end to end, so that the applicant passed in front and was helped to bread, sugar, coffee, salt meat, fresh meat, etc., until the entire bill of fare was completed, when they passed on out at the opposite end.

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[1] See page 159.

First at a desk stood the assistant superintendent, who, when the ration ticket was presented, turned to the name arranged by numbers, and alphabetically checked the same, and punched out from the margin of the ticket the number of rations called for.

This register was revised by a new census, taken every Sabbath morning, when all changes were noted. When the ticket was exhausted a new one was substituted. Five hundred tickets were in this manner served in two hours. The meat was cut up by experts, and in readiness for issue before sounding the call. Fraud in procuring rations, petty theft, habitual insubordination, croaking, and nuisances, were punished by immediate expulsion from camps.

Wood and water were hauled by drays to such as were unable to bear the burden. Fires were kept burning in front of tents occupied by women and children, and during the early part of damp evenings. Water barrels were stationed at intervals throughout the camp, which were replenished daily, or as the consumption required. Kitchen pits, two by four, and five feet deep, were dug twenty-five feet in rear of tents, and at intervals of forty yards; all slop and refuse garbage were thrown into the same. The sinks were dug one hundred feet in rear, and of width and length so as to be easily covered by one A-tent erected over the same, marked distinctly *Males — Females.* The seats were neatly dressed off and with three nicely rounded openings. The sanitary force, at police call, made the rounds with lime, zinc and iron solution, and mops. Every vault and pit was administered to and report made thereon.

The camp force consisted of, —

One assistant superintendent, on the ground.
One surgeon in charge.
One assistant commissary and quartermaster — three assistants.
One chief clerk.
One dispensary clerk.
Four sanitary hands, who were sextons, pit diggers, tent erectors, etc.
Three bakers and one helper.
One carpenter.
One hospital matron.
One hospital cook.
One headquarter cook.
One boss of men, wagons, and tools.
Three draymen.

To which force were added from time to time, *without pay*, handy men of the inhabitants.

Army rations were furnished, and by the schedule laid down in the United States regulations. Blankets were dispensed by the surgeon in charge when absolute necessity required. Beds were built of four forks, eighteen inches high, driven in the ground, covered with poles or plank, pieces of boxes, or barrel staves, straw, either loose or in ticks, laid thereon. The whole encampment was policed daily and from end to end. The trees were trimmed up and whitewashed, and no pains spared to insure comfort and health. Swings and whirligigs were erected for the children, and divine service was held weekly. General good order prevailed. It requires a humane experienced man, having domestic experience, firm and determined. Such a man only can make a refugee camp habitable.

Average number of people drawing rations from Camp Marks	1,304
Number of yellow fever cases treated	9
Number of deaths from yellow fever	4

The camp broke up October 28, 1879. All hospital furniture, bedding, etc., were burned, the building fumigated and torn down and sold on the ground. Two of the population were taken ill of the fever after their return to the city; both died. The general health of the camps was good. A low temperature prevailed, together with considerable damp, cloudy, and rainy weather. This, in the earlier settlement, might have produced disorders common to camp life, but a few weeks acclimation, during a period of dry and pleasant weather, hardened the system, and fitted old and young for the inclement weather which followed. A city may be depopulated in this manner at the rate of 1,000 per day. All that is required will suggest itself to the mind of an experienced field army quartermaster, and a pushing, practical surgeon, backed by a moderate purse.

Register of Refugees and Citizens Rationed from Treasury of Safety Committee during Epidemic of 1879.

RATIONED FROM WAREHOUSE AT............FROM............TO............

Date.	Names.	Age.	Color.		Registered.	No. Adults.	No. Children.	Occupation.	Where Camped.	Died.	Total Rations.	Ending.	Remarks.
			White.	Colored.									
													ARMY RATIONS. Children over 8 years, class Adults; under 8 years, Half Rations.

CONDENSED MORNING REPORT.

.........................., *Commanding*. ...., 18..

Camp Father Mathew.	Deaths.
	Sick.
	Children.
	Adults.
	Captain.
Camp Marks.	Deaths.
	Sick.
	Total.
	Cooks.
	Bakers.
	Children.
	Adults.
	Laborers, Sanitary.
	Guards.
	Porters.
	Nurses.
	Draymen.
	Butchers, 1½ Pay.
	Carpenters.
	Wagon Masters.
	Surgeons.
	Clerks.
	Captains.
State Troops.	Deaths.
	Sick.
	Total.
	Children.
	Adults.
	Musicians.
	Cooks.
	Privates.
	Non-Com. Officers.
	Lieutenants.
	Captains.

Grand Total.	
	Yellow Fever.
	Total Sick.
Teutonic.	Deaths.
	Sick.
	Total.
	Children.
	Adults.
	Captain.
Camp Langstaff.	Deaths.
	Sick.
	Total.
	Cook, no Pay.
	Children.
	Adults.
	Captain.
Camp Burke.	Deaths.
	Sick.
	Total.
	Children.
	Adults.
	Captain.
Camp Benjes.	Deaths.
	Sick.
	Total.
	Children.
	Adults.
	Captain.

REMARKS:

Table, showing the Quantity and Bulk of any number of Rations, from 1 *to* 100,000. *Issued under the direction of the Committee of Safety.*

Number of Rations.	Pork, Bacon Sides, Shoulders, Hams, etc.		Beef, salt and fresh, and Corn Meal.	Flour and Soft Bread.	Beans, Peas, and Sugar.[1]		Rice, Hominy, Green Coffee.		Roasted Coffee.[2]		Tea.		Vinegar.			Candles, Adamantine or Star.		Soap.		Salt		Pepper.		Potatoes.[3]		Molasses.		
	Pounds.	Ounces.	Pounds.	Pounds.	Pounds.	Ounces.	Pounds.	Ounces.	Pounds.	Ounces.	Pounds.	Ounces.	Gallons.	Quarts.	Gills.	Pounds.	Ounces.	Pounds.	Ounces.	Pounds.	Ounces.	Pounds.	Ounces.	Pounds.	Ounces.	Gallons.	Quarts.	Gills.
1	......	2	1	1	......	2.4	......	1.6	......	1.28	.....	.24	......	....	.32	......	.2	......	.64	......	.6	....	.04	....	4.8	....	....	.08
2	1	8	2	2	......	4.8	......	3.2	......	2.56	.....	.48	......	....	.64	......	.4	......	1.28	......	1.2	....	.08	....	9.6	....	....	.16
3	2	4	3	3	......	7.2	......	4.8	......	3.84	.....	.72	......	....	.96	......	.6	......	1.92	......	1.8	....	.12	....	14.4	....	....	.24
4	3	..	4	4	......	9.6	......	6.4	......	5.12	.....	.96	......	....	1.28	......	.8	......	2.56	......	2.4	....	.16	1	3.2	....	....	.32
5	3	12	5	5	.....	12.0	......	8.0	......	6.4	.....	1.2	......	....	1.6	......	1	......	3.2	......	3	....	.20	1	8	....	....	.40
6	4	8	6	6	......	14.4	......	9.6	......	7.68	.....	1.44	......	....	1.92	......	1.2	......	3.84	......	3.6	....	.24	1	12.8	....	....	.48
7	5	4	7	7	1	.8	......	11.2	......	8.96	.....	1.68	......	....	2.24	......	1.4	......	4.48	......	4.2	....	.28	2	1.6	....	....	.56
8	6	..	8	8	1	3.2	......	12.8	......	10.24	.....	1.92	......	....	2.56	......	1.6	......	5.12	......	4.8	....	.32	2	6.4	....	....	.64
9	6	12	9	9	1	5.6	......	14.4	......	11.52	.....	2.16	......	....	2.88	......	1.8	......	5.76	......	5.4	....	.36	2	11.2	....	....	.72
10	7	8	10	10	1	8	1	....	......	12.8	.....	2.4	......	....	3.2	......	2	......	6.4	......	6	....	.40	3	....	....	....	.80
20	15	..	20	20	3	....	2	....	1	9.6	.....	4.8	......	....	6.4	......	4	......	12.8	......	12	....	.80	6	....	....	....	1.60
30	22	8	30	30	4	8	3	....	2	6.4	.....	7.2	......	1	1.6	......	6	1	3.2	1	2	....	1.2	9	....	....	....	2.40
40	30	..	40	40	6	....	4	....	3	3.2	.....	9.6	......	1	4.8	......	8	1	9.6	1	8	....	1.6	12	....	....	....	3.20
50	37	8	50	50	7	8	5	....	4	12.8	.....	12.0	......	2	......	......	10	2	6.4	1	14	....	2	15	....	....	....	4
60	45	..	60	60	9	....	6	....	4	9.6	.....	14.4	......	2	3.2	......	12	2	12.8	2	4	....	2.4	18	....	....	....	4.8
70	52	8	70	70	10	8	7	....	5	6.4	1	.8	......	2	6.4	......	14	2	3 2	2	10	....	2.8	21	....	....	....	5.6
80	60	..	80	80	12	....	8	....	6	3.2	1	3.2	......	3	1.6	1	......	3	9.6	3	....	....	3.2	24	....	....	....	6.4
90	67	8	90	90	13	8	9	....	7	......	1	5.6	......	3	4.8	1	2	3	......	3	6	....	3.6	27	....	....	....	7.2
100	75	..	100	100	15	....	10	....	8	......	1	8	1	....	......	1	4	4	......	3	12	....	4	30	....	....	1	....
200	150	..	200	200	30	....	20	....	16	......	3	.....	2	....	......	2	8	8	......	7	8	....	8	60	....	....	2	....
300	225	..	300	300	45	....	30	....	24	......	4	8	3	....	......	3	12	12	......	11	4	....	12	90	....	....	3	....
400	300	..	400	400	60	....	40	....	32	......	6	.....	4	....	......	5	......	16	......	15	....	1	......	120	....	1	....	....
500	375	..	500	500	75	....	50	....	40	......	7	8	5	....	......	6	4	20	......	18	12	1	4	150	....	1	1	....
600	450	..	600	600	90	....	60	....	48	......	9	.....	6	....	......	7	8	24	......	22	8	1	8	180	....	1	2	....
700	525	..	700	700	105	....	70	....	56	......	10	8	7	....	......	8	12	28	......	26	4	1	12	210	....	1	3	....
800	600	..	800	800	120	....	80	....	64	......	12	.....	8	....	......	10	......	32	......	30	....	2	......	240	....	2	....	....
900	675	..	900	900	135	....	90	....	72	......	13	8	9	....	......	11	4	36	......	33	12	2	4	270	....	2	1	....
1,000	750	..	1,000	1,000	150	....	100	....	80	......	15	.....	10	....	......	12	8	40	......	37	8	2	8	300	....	2	2	....
5,000	3,750	..	5,000	5,000	750	..	500	....	400	......	75	.....	50	....	......	62	8	200	......	187	8	12	8	1,500	....	12	2	....
10,000	7,500	..	10,000	10,000	1,500	...	1,000	....	800	......	150	.....	100	....	......	125	......	400	......	375	....	25	......	3,000	....	25	....	....
50,000	37,500	..	50,000	50,000	7,500	....	5,000	....	4,000	......	750	.....	500	....	......	625	......	2,000	......	1,875	....	125	......	15,000	....	125	....	....
100,000	75,000	..	100,000	100,000	15,000	....	10,000	....	8,000	......	1,500	.....	1,000	....	......	1,250	......	4,000	......	3,750	....	250	......	30,000	....	250	....	....

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[1] Beans, peas, salt, and potatoes (fresh) shall be purchased, issued, and sold by weight, and the *bushel* of each shall be estimated at *sixty pounds.*

[2] *Roasted and ground* coffee is issued at the same rate as roasted coffee.

NOTES. — Fresh onions, beets, carrots, and turnips, when on hand, may be issued *in lieu of* beans, peas, rice, or hominy, and at the rate of potatoes (fresh), viz.: thirty pounds to 100 rations.

Dried apples, dried peaches, pickles, etc., when on hand, may be issued *in lieu of* any component part of the ration, of equal money value.

MORNING REPORT.

.........................., 1879.

Captains.	Lieutenants.	Non-Com. Officers.	Privates.	Adults.	Children.	Surgeons.	Porters.	Guards and Sanitary.	Carpenters.	Butchers.	Draymen.	Cooks.	Wagon Masters.	Nurses.	Horses.			Total.	Sick.	Deaths.	

.............................., *First Sergeant.*

.... *Commanding.*

REMARKS:

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....

SHELBY COUNTY MEDICAL SOCIETY.

Date....18..

Name of Patient..
Age ....
Residence ....
When Attacked...
Nature of Disease ....

Date.	Time.	P.	T.	R.	Eye.	Tongue.	Skin.	Kidneys.	Primæ Viæ.

General Remarks:

....

....

.............................., *Attending Physician.*

NEW CASES, DEATHS, AND RATE PER CENT. FROM SEPTEMBER 20 TO OCTOBER 24, 1879.

	New Cases.		Deaths.		Per Cent.		Notes, John F. Cameron, A. D. C.
	White.	Colored.	White.	Colored.	White.	Colored.	
Cases treated at City Hospital (Dr. Lawrence in charge)	23	8	11	1	47.9	12.5	Total Rate 38.9 per cent.
Cases treated at home (Faculty generally) . .	161	101	74	18	45.9	17.9	Total Rate 35.4 per cent.
Total cases within Taxing District -	184	109	85	19	46.2	22.3	Total Rate 35.5 per cent.

MORNING REPORT.

....1879.

Captains.	Lieutenants.	Non-Com. Officers.	Privates.	Adults.	Children.	Surgeons.	Porters.	Guards and Sanitary.	Carpenters.	Butchers.	Draymen.	Cooks.	Wagon Masters.	Nurses.	Horses.		Total.	Sick.	Deaths.		

.... Commanding.

.... First Sergeant.

REMARKS :

MEMPHIS, TENN.,.. 1879.

I have this day received of EUGENE LEIDY, Supply Agent for the Committee of Safety, the following property, which I pledge myself to return, or properly account for on my return to the city: —

PROPERTY.	LOCALITY.
....	....
....	....
....	....
....	

(Signed)

....

City Residence..

PROCEEDINGS AND DISCUSSIONS AT THE SEVENTH ANNUAL MEETING.

NASHVILLE, TENN., NOVEMBER 18–21, 1879.

TUESDAY, NOVEMBER 18.

THE Association convened in the Hall of the House of Representatives at 12.20 P. M., the President, DR. J. L. CABELL, in the Chair.

DR. J. S. BILLINGS, First Vice-president, read a list of candidates recommended by the Executive Committee, all of whom were elected members of the Association.

The President called for the report of the committee appointed at the last meeting to memorialize Congress in regard to the publication of the Index Catalogue of the National Medical Library, whereupon DR. R. W. MITCHELL, of Memphis, made the following report: —

J. L. CABELL, *President of the American Public Health Association*: —

Your committee appointed at a meeting of this Association held in Richmond, Va., November, 1878, to memorialize Congress, urging that it authorize the publication of the Index Catalogue of the National Medical Library at Washington, have the honor to report that they prepared and forwarded a memorial as directed, sending one copy to the Senate and a second to the House of Representatives.

The chairman of your committee also had personal interviews upon the subject with the chairman of the Committee on Appropriations of the House, Hon. J. D. C. Atkins, of Tennessee. The result was the passage in one of the appropriation bills of the following clause, namely, For printing and binding the first and second volumes of the Index Catalogue of the Library of the Surgeon-general's office, twenty thousand dollars, to be immediately available.

In accordance with the law, the work of printing is now going on, and your committee congratulate the Association upon the favorable prospect which now exists for the completion of this extremely important work, in which physicians and sanitarians of all countries are so deeply interested.

It should be remembered, however, that additional appropriations will be required to complete the work, and this Association should exert its influence to insure that these appropriations shall be promptly and regularly made.

It is recommended that the present committee be continued, with instructions to urge upon Congress the necessity of providing for the completion of the work.

It is also recommended that a vote of thanks be given to the Hon. Isham G. Harris, United States Senator, and to Hon. J. D. C. Atkins, Chairman of the Committee on Appropriations of the House of Representatives, for presenting the memorial of your committee respectively to the United States Senate and House of Representatives, and for attention given by them to the representatives of this Association. Respectfully submitted,

R. W. MITCHELL, Chairman.
H. I. BOWDITCH.
S. M. BEMISS.
WIRT JOHNSON.
HENRY B. BAKER.

DR. J. S. BILLINGS, who is in charge of the library of the Surgeon-general of the United States Army, at Washington, stated that this was the largest exclusively medical library in the world, embracing about 50,000 volumes, and about the same number of pamphlets. Of these, about 12,000 volumes were medical journals, and transactions of medical societies, all the important papers in which were indexed by authors and by subjects, so that they could be found without difficulty. The work of printing the catalogue has been commenced, and the first volume would be ready in May. The complete work would embrace ten or twelve volumes. Members of the American Public Health Association were invited to consider the library as their own, and to see that all important contributions to medical science, emanating from themselves, should find places in the collection.

INVITATIONS.

DR. J. BERRIEN LINDSLEY, Local Secretary, said he had received invitations for the members to visit the Tennessee Central College, the State Normal College, Fisk University, the city schools, Vanderbilt University, and the Custom House. He also read the following note: —

BELLE MEADE, NEAR NASHVILLE, TENN., *November* 16, 1879.

DR. J. BERRIEN LINDSLEY, *Local Secretary, etc.*

Dear Sir: It gives me pleasure to extend, in the name of General Harding, an invitation to the members of the American Public Health Association to visit Belle Meade at such time during their meeting as may best suit their convenience and pleasure.

Considering the importance of their self-imposed work for the amelioration of the ills to which flesh is heir, it is gratifying to have such a convocation of medical and scientific gentlemen assemble in the capital of our State, and I sincerely hope that their deliberations may be productive of great good, and that their stay among us may be marked by an unstinted hospitality. Yours truly,

W. H. JACKSON.

On motion of Dr. Billings, it was voted to accept General Jackson's invitation for Thursday afternoon, and the Secretary was instructed to express the thanks of the Association to General Harding through General Jackson, and to notify him of the acceptance of this invitation.

FREEDOM OF THE WIRES.

The Local Secretary also read the following note: —

Western Union Telegraph Company, Superintendent's Office,
Nashville, Tenn., *October* 21, 1879.

Dr. J. Berrien Lindsley, *Secretary Committee of Arrangements of Sanitarians, Nashville, Tenn.*

Dear Sir, — In reply to your favor of the 10th inst., the freedom of our wires is cheerfully tendered to the officers in their official capacities, and to the members for domestic purposes, during the sitting of the convention.

Yours truly,
J. Compton, *Superintendent.*

ORDER OF BUSINESS.

The following resolution of the Executive Committee, regarding the order of business, was presented: —

Resolved, That after the leading paper on each subject, as indicated by the Executive Committee, has been read, discussion shall be strictly limited to the subject of the paper, and each speaker shall be limited to a speech of ten minutes, and to one of five minutes if he speaks a second time, and no excess of this time shall be allowed except by unanimous consent. The reader of the opening paper shall be allowed ten minutes at the close of the discussion. Gentlemen intending to speak are requested to send their names to the President in writing, and they will be called on in the order in which their names are handed in.

TRANSACTIONS OF THE LAST MEETING.

Dr. E. M. Hunt, of New Jersey, chairman of the Publication Committee, made a verbal report relative to the publication of the Transactions of the last meeting, to the effect that the publication had been unavoidably delayed, but that the report would soon be forthcoming.

The Association then adjourned until 3 P. M.

AFTERNOON SESSION.

Col. George E. Waring, of Newport, R. I., read a paper on the Drainage and Sewerage of Cities. (See page 35.)

Dr. Azel Ames, of Wakefield, Mass., said that he regretted that Colonel Waring had been willing, with his vast knowledge and experience, to place in secondary position the outside disposal of sewage. In considering many systems of sewerage, they should look to the end of what they undertook. The absolute and final disposal of sewage was no secondary matter. They could not do better than to consider the things together. The difficulties in making the separation were great, but, in adopting this system, the final disposal must always be a tag to it. The construction of streets, too, was very closely allied to this question. The cost of pumping had not been met, and he was surprised that it had not, but it could be met by inexpensive apparatus depending on compressed air. He was glad the junction of sewers had been so enlarged on, as most of the difficulties experienced in sewerage were dependent upon the improper junction of the sewers. He would ask Colonel Waring as to the use of flush tanks — whether there was any emanation from them in large accumulation?

Colonel Waring. — Never, when properly arranged.

Dr. White, of Milwaukee, was sorry to disagree with Dr. Ames on one point. It was an axiom in sanitary science that all organic refuse should be removed before undergoing decomposition. It had been proved that organic matter was most poisonous just before passing into the putrefactive state. The primary question, then, was the question of prompt removal The question of ultimate disposal was a secondary matter.

He fully agreed with Colonel Waring as to the necessity of separating storm water from the sewage proper, or the drainage of dwellings, etc. But some kinds of organic matter could not be removed by sewerage of any kind. Garbage must be carted away, and that within twenty-four hours — before it could pass into the condition of putrefaction. England was giving more attention to this matter of late years. In Manchester, half a million of people had recently been brought within a system of removal by carts. Eighty thousand pounds had been appropriated for the construction of a factory in which this kind of refuse matter was changed into a serviceable and a salable manure. Glasgow had brought 80,000 of her population within a system of dry removal. The two systems must be combined to secure effective sanitary results. In regard to the prevalence of epidemics, he believed that yellow fever, typhoid fever, or diphtheria could not possibly become epidemic in a city or town that was kept clean. He was in favor of a system of quarantine. He held it to be the duty of the Federal or State government to prevent the removal from one place to another of merchandise or effects which might carry contagion to places previously free from disease.

Dr. J. W. Compton, of Evansville, Ind., agreed with Colonel Waring as to the dangers of underground sewerage. His city suffered from sewer gas emanating from twelve miles of sewerage, with a population of 40,000. A number of branch sewers from slaughter-houses contributed to this result. Evansville had one hundred miles of surface-drained streets. The sewers were very impure, from the quantity of matter going through. Where impure sewers existed, they were liable to become hotbeds for the propagation of diseases. The sewers did not have sufficient fall to drain themselves, and hence their danger. Much that he had intended to say had been said in the paper under discussion.

Dr. Compton then presented a paper on Underground Sewers, of which the above remarks form a brief abstract. (See page 41.)

Dr. A. N. Bell, of New York, said he had listened with the more pleasure to the reading of the paper, because it had replied so well to a recent address by Dr. Fergus, whose objections to the water-carriage of sewage were not applicable to the system of small sewers so ably presented in the paper before us; but to the systems of unsanitary engineering which now commonly obtain in our large cities. He was fully persuaded that no subject was so well fitted to open this meeting, or more worthy the attention of the Association. Nearly allied to the subject of sewerage and drainage, indeed a part of it, is that of pavements; and without good sewerage and drainage our Southern cities can have no good pavements, on account of the softness of the soil. He would like to hear Colonel Waring's opinion on the material for making sewers. Nothing was so filthy as brick fully saturated with excrementitious matter, and yet this was the material mostly used. The suggestions made as to the disposal of sewage at once, and not storing it up in our rooms and around our houses, to poison so many people with foul gases, were fully approved of by Dr. Bell. But, however perfect these arrangements, we should not forget, he said, that ships, too, have their foul drains; and he should be sorry to think that Colonel Waring's allusion to the subject of quarantine as being of lesser importance, might have the effect of distracting our attention from the importance of quarantine. He admitted it was of secondary importance as compared with civic cleanliness, — including sewerage and drainage, — but it was nevertheless a powerful arm of defense against the introduction of epidemic diseases, and we cannot afford to belittle its importance.

Dr. Lloyd Howard, of Baltimore, said there were but few sewers in Baltimore. These were tapped by certain hotels. The drainage was surface drainage. He combatted the idea that sewers would banish yellow fever from Memphis. If quarantine was to be abandoned and the sewerage fallacy taken up entirely, they would find themselves vastly mistaken. It had been demonstrated that yellow fever could prevail in a town which was clean. He believed in strict quarantine.

Colonel T. S. Hardee, of New Orleans, said that Dr. Ames had alluded to the idea of using compressed air in connection with sewerage. He would state that the idea had already been put in practical operation in Great Britain, under the name of Shone's system, and was considered, as far as could now be judged, superior to any other plan for getting rid of the disadvantages connected with sewerage. In a city like New Orleans, where the ground is so flat and where there is so little natural gravitation for the easy flow of water in pipes, these disadvantages are very great, and some such appliance as compressed air, for the rapid and efficient discharge of accumulations into the river, is very much needed. In conclusion, Colonel Hardee asked Colonel Waring if he had any reliable information concerning the system alluded to.

Colonel Waring said that he had received a full description from the inventor of the method.

Dr. Tadlock, of Knoxville, Tenn., said that sewerage had for years been left to plumbers, but of late years sanitarians had taken up the question. In Knoxville they were opposed to any kind of sewerage, as they had fine surface drainage and no low land. However necessary it might be for large cities, there were many towns better off without it. There was a feeling against bringing in pork that had been fed on sewage. In Tennessee there was a law against polluting the water of streams, but it was violated by every city and town which turned its filth into them, poisoning the fishes and making them unfit for food.

Dr. Elisha Harris, of New York, wished to call attention to the importance of securing a copious water supply in furtherance of a sewerage system. The great question with sanitarians was what system of sewerage was required. In small towns he found from inquiry the supply of water for one person ranged from one hundred to thirty gallons. The sewers should be supplied with water sufficient to float the sewage. The old system of sewerage fell far short of what sanitary science now demanded. Having visited certain cities, and examined their sewerage, he found, with other faults which had been mentioned, that the engineering of the systems was far from ample, and did not near correspond with the needs of the several cities. He thought the great want on this question was some recognized standard of fitness and excellence.

Dr. Ames thought it was just as important to find a place of deposit — upon low places or upon farms — as it was to provide sewerage pipe to conduct filth from cities. The time would come when all the garbage of cities would be carried off and used for agricultural purposes.

Dr. E. M. Hunt, of Metuchen, N. J., brought out a number of points suggested by the report of the City Engineer of Grand Rapids, Mich. He characterized the system of Colonel Waring as complicated in character, in requiring three separate and distinct methods of removal, namely, a storm water system, a house drainage system, and separate system for ground water. He did not believe that the effective capability of a sewer could be determined in inches ; more depends upon the question of velocity of flow and the shape. He would draw attention to the fact that the natural underground streams frequently interfered with the working of sewers. As to the substance of which sewers should be constructed, he did not consider brick as objectionable, provided the brick was well burned and tested, and laid in good cement.

In reply to a question, Colonel Waring explained that in using the term pipe, he referred to vitrified clay pipe.

Dr. A. N. Bell, of New York, said that, as far as the faults of a new system of sewerage were concerned, the same imperfections would be found in the old.

Dr. A. L. Gihon, United States Navy, said Dr. Howard had anticipated a question which he wished to ask, concerning the sewerage of Baltimore.

Colonel Waring said he had been unfortunate in his allusion to the quarantine, as it had been thought that he opposed quarantine. The idea that he intended to convey was, that a cleanly condition would aid quarantine. They, as sanitarians, could talk sewerage, but it was for the people who had the bills to pay, who had to carry them out. If sewerage could not be effected, they should not be discouraged from drainage, as far as their power lay. In reply to the question of Drs. Howard and Gihon, he would say that he advocated what was known as the Baltimore plan, of connecting sewers with slaughter-houses, aided by such machinery as might be needed. He explained at length the system of sewerage advocated in the paper which he had read. A test of the flow of water in sewerage had been made in Rhode Island, on Monday morning, the Rhode Island washing day. The sewer tested was used by 267 persons, and the flow of water at the most was three fourths of an inch, and that only for an instant. The sewer was twelve inches in diameter. He also gave examples of the tests now being made in New York city.

Dr. A. L. Gihon spoke of the blocking up of sewerage when near willow or elm trees.

COLONEL WARING said that would have to be guarded against.

The Secretary read the following invitations, for which the thanks of the Association were returned : —

NASHVILLE, *November* 18.

TO THE PRESIDING OFFICER AND MEMBERS OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.

Gentlemen : The Young Men's Christian Association of Nashville and Edgefield extend a cordial invitation to your honorable body during your sojourn in Nashville, to visit their library and reading room, corner Union and Cherry Streets. We keep constantly on file many of the leading papers of the country as well as the most popular magazines and many other periodicals.

The doors of our reading room are open from 8 A. M. to 10 P. M.

Very respectfully yours, FRANK P. HUME, *Librarian.*

NASHVILLE, *November* 18, 1879.

TO THE PRESIDENT OF THE AMERICAN PUBLIC HEALTH ASSOCIATION, J. L. CABELL, M. D.

Dear Sir : It affords me pleasure to welcome you to Nashville, and hereby to invite you and the Association to visit my seminary at your convenience, to witness a calisthenic drill.

Very truly and respectfully, W. E. WARD,
Principal of Ward's Seminary.

The Association then adjourned until 7.30 P. M.

EVENING SESSION.

The Association met at 7.30 P. M., the President, DR. CABELL, in the chair.

The President introduced Gov. A. S. MARKS, who delivered the following address of welcome.

THE GOVERNOR'S ADDRESS.

I wish it were in my power to express to you how glad we are that you have come among us and how cordially we welcome you to our State.

It has been our fortune to fall on troublous times. The twin monsters of war and pestilence breathed their withering breath over our lovely land, and blight and desolation followed. When our night of affliction was so dark you can never understand, gentlemen, how comforting it was to us to know that all over our broad land there were benevolent men whose hearts flowed out to us in generous sympathy and whose genius was employed in an untiring effort to dethrone and destroy the deadly enemy so fiercely afflicting us.

We have always wanted these noble men to come among us, that we might personally testify to them how we esteemed them, how we honored them, and how we loved them.

We congratulate ourselves that at least in the capital of our State it is our good fortune to greet the accredited representatives of those noble men who remembered us in the day of our affliction. We congratulate ourselves, too, that it was put into your hearts to leave your homes in distant States to meet together here in council to advise and organize a defensive campaign to protect us from the assault of our subtle and dangerous enemy

With profound gratitude, animated by your benevolence, and with a cheerful hope, inspired by our confidence in your genius, gentlemen, we extend you, one and all, a cordial welcome to our State, our homes, and our hearts.

Ordinary governments concern themselves about questions of boundary and methods for the acquisition of wealth and power in their international competitive struggle for supremacy; but in the great humanitarian government, whose representatives you are and in whose councils you deliberate, there is no concern in regard to boundaries, for, however far man may stray, he bears with him the monuments of your beneficent government. In the deliberations and resolutions of your council, no policy which looks to the aggrandizement of a part of the human family at the expense of another finds a place, but, on the contrary, its legislation, like the laws of heaven, comprehends the whole family of mankind in its operation and benefits.

The military campaign, however high the principles upon which it may be conducted, necessarily has for its object blood, death, and destruction. The laurel which wreathes the brow of military renown is fertilized by the blood and tears of mankind; but the glorious war you wage is for the great brotherhood of man, and peace, health, and human life are the trophies of your conquests. The olive which crowns your heroes is the growth of a charity as broad as humanity and a love as high as the heavens.

From your separate quarries you have brought your several contributions, and in convention here, we trust, you will build a pyramid so high that from its summit you may have a view so broad and clear that you may be able to develop and eradicate the secret curse which "walketh in darkness, that wasteth at noonday."

But whether success crowns your efforts with a victory so rich for mankind or not, yet as gallant soldiers in the cause of humanity, you shall always have at our homes a hearty, cordial welcome.

Governor Marks then introduced DR. E. M. WIGHT, President of the Tennessee State Medical Society, who spoke in behalf of that body as follows:—

ADDRESS OF PRESIDENT WIGHT.

GENTLEMEN OF THE AMERICAN PUBLIC HEALTH ASSOCIATION: On the part of the Medical Society of Tennessee, it is my high privilege to welcome this body to the State of Tennessee. Had I words to express the feelings of my heart, and the heart of the great brotherhood of medicine that throbs in common with you, the welcome with which I would greet you would bear comparison only with that keen sense of gratitude we feel, that gratitude that is known to be the keenest of all—for the favors that we expect from your presence, for by your presence, your very faces, your words, and your works, we are animated and encouraged. His Excellency, our Governor, has so well expressed the welcome we all feel that I need not detain you. True it is that we have suffered from dire pestilence and its disaster; true it is that our hearts go out in fullest thanksgiving toward the great and good people of the nation for their generous bestowals to us in the days of our troubles. But there are brighter days in store for us. This great and beautiful State of Tennessee, *you say*, shall not longer be the field of pestilence, for you have come with science in hand, saying, "pestilence shall be driven from our borders." For now nearly sixteen years I have followed the quiet pursuits of the physician in this beautiful, sun-lit climate, this land with its mountains of six thousand feet, with its ever green balsams in the east, its broad tables of elevated plateau toward the centre, its basin, where blooms the magnolia, and its cane-brakes in the west to the very banks of the Father of Waters. This is indeed the beautiful land, never too hot, never too cold. The smiles of heaven have marked it. It is the home for man and from it pestilence must go. It is too good ; it must be saved. Again, gentlemen, we bid you welcome. We need you. We are rejoiced that you are here, and that you are here now.

Governor Marks then introduced MAYOR THOMAS KERCHEVAL, who spoke in behalf of the citizens of Nashville.

ADDRESS OF THE MAYOR.

GENTLEMEN OF THE AMERICAN PUBLIC HEALTH ASSOCIATION : The pleasant privilege devolves upon me, on behalf of the city authorities and the good people of Nashville, of extending to your Association a most cordial welcome to our city, which I now do, and in so doing, I but feebly express to you the kind sentiments of our people when I inform you that they deeply feel and appreciate the very high honor and compliment which your Association has conferred upon us by selecting the city of Nashville for the meeting of your Convention, especially when I recognize the fact that there are many larger and much more attractive cities of equally convenient access as Nashville. You will find our people hospitable, warm and generous-hearted, and ready to share all they have with you, and to do everything in their power to make your visit and stay pleasant and agreeable while with us. We will spare no means upon our part which may be likely to add to your efforts in making your meeting what it should be — a grand success.

It may not be out of place to inform you that this meeting has been looked for long and anxiously by our people, especially those farther south and west of us, where they have suffered so terribly from the ravages of the yellow fever for the last two summers. The city of Nashville has enjoyed a most wonderful immunity from yellow fever, for while there were hundreds of refugees from the infected fever localities, who daily came within our limits, and a number of whom sickened and died with the fever, yet the records show that Nashville did not have one single indigenous case during the whole time.

Whether this fact may be attributed to the action and efforts of our city Board of Health, or to some Providential intervention, I will not, upon this occasion, pretend to discuss, further than to give it as an opinion that sanitary and preventive medicine had much to do with it.

Our people have great confidence in the wisdom and action of this honorable Association, and they will eagerly watch and anxiously read everything that may be published from your proceedings, hoping to find or learn of some remedy or panacea that may shield and protect them against the like terrible ordeals through which they have so lately passed. Judging from the intellectual and eminent gentlemen of the profession composing so large a convention as this one, I may safely predict that the people will not be disappointed in the final results of this meeting.

Therefore, gentlemen of the Association, hoping that your visit while with us may be one of the most pleasant character, and that your meeting will be harmonious, and one that will be greatly beneficial to our common country, and that it will accomplish all the ends and purposes for which it was intended, I again bid you a hearty and cordial welcome to the city of Nashville.

The President then delivered the annual address (see page 1).

The Association adjourned to 10 A. M., on Wednesday.

WEDNESDAY, NOVEMBER 19.

The Association met at 10 o'clock A. M., the President, DR. J. L. CABELL, in the chair.

Prayer was offered by Rev. Dr. T. A. HOYT.

DR. BILLINGS read a list of candidates for membership, approved by the Executive Committee, who were elected members of the Association.

The following communication was read by DR. J. BERRIEN LINDSLEY: —

NASHVILLE, TENN., *November* 19, 1879.

TO THE AMERICAN PUBLIC HEALTH ASSOCIATION.

Gentlemen, — I extend to you a cordial invitation to visit the Nashville Fire Department, during your stay in the city, and witness the workings of the same in connection with the fire alarm telegraph. I shall be glad to wait upon you in a body or in groups, as may best suit your convenience.

Very respectfully,
WM. STOCKWELL, *Chief Engineer.*

Dr. Lindsley announced that Mrs. James K. Polk would take pleasure in receiving the Association immediately after its adjournment at 1 P. M.

DR. HARRIS said he thought the invitation ought to be accepted with thanks to a lady who, during her husband's administration, presided at the White House with so much dignity and grace. He moved that the Secretary be requested to notify her at once that the Association accepted her kind invitation, and would call for a few moments in accordance with her request. The motion was seconded and adopted.

DR. CHARLES F. FOLSOM, of the Massachusetts State Board of Health, Lunacy, and Charity, then read a paper prepared by Eliot C. Clarke, C. E., entitled "City Scavengering at Boston." (See page 24.)

REV. DR. HUGH MILLER THOMPSON, of New Orleans, then read a paper, entitled "Disposal of the Garbage of New Orleans." (See page 32.)

DR. AMES said that city garbage was valuable to farms as manuring material. Earth closet products could be used with profit on lands. Night soil to the amount of $2,837 was taken out of two pits in Philadelphia, the farmers paying $1 per load for it. He thought garbage should be placed in air-tight barrels lined with asphalt, so that they could be easily washed out with a hose. There was an ownership in garbage; one hotel in New York sold it at the rate of $2,000 per annum. Should the garbage be removed in accordance with law, the owner would have the right to remove it himself.

PROF. W. H. BREWER, of New Haven, said that he had found in some of the New England cities that kitchen garbage had been very disastrous to pigs and swine, many of them having died from eating it. On this account it was in great disrepute among farmers, and it came to be used on land simply as manure. Street cleanings had often been found worthless as manure. The material taken from catch-basins was almost useless as manure, and had been discarded.

Dr. A. N. BELL, of New York, said, that the value of street cleanings differed in different places. Some farmers around New York had regarded the street cleanings of that city and Brooklyn as valuable, and had offered to take them without cost to the city governments. He supposed their value depended in a great measure upon their freshness, before they had lain too long subject to the decomposing influences of the sun's rays. So, too, in regard to the value of garbage as food for hogs; it hardly seemed necessary to state that it should be fresh, and that it was dangerous matter to keep about the house; both health and utility required its prompt removal. While for filling purposes, to which it had been freely applied in most of our cities, it should be prohibited, as it was in a high degree dangerous, and for an almost indefinite period of time. The Harlem marsh of New York, which was being built over, was full of animal matter and foul odors from this cause, and would, doubtless, for many years, be unhealthful for human habitation. He knew of cellars in New York, thirty or forty feet below the sewer, founded at the bottoms of pits years before filled up with street sweepings and house garbage. Just think of the inflow of foul gases from this cause in houses, and no pains taken to make the cellar floors and walls impervious. He had no doubt that the malarial fevers which had prevailed in New York originated from the fact that houses were built upon this made-up soil, the foundations being laid far below the surface, in order to come to solid earth. Blocks had been built on this soil which had been dumped there in filling up the low lands now brought into use.

DR. W. F. CAMPBELL, of Augusta, Ga., remarked that the odor from garbage or flesh did not remain as long as some believed. He gave an instance of exhuming a murdered man, ten months after death, where no odor remained. An earthy smell was only to be observed. The flesh could be stripped from the bones like newspaper, with no disagreeable effect upon those doing the work. The flesh had been so completely destroyed that even a knife did not have to be used to remove the tendons.

DR. BELL suggested that the body had been buried in a sandy soil.

DR. CAMPBELL said that he did not go back to a 40,000 year old mastodon to find an odor. He had given this as an isolated case, and as showing another side of the question of how long an odor remained in the earth.

Dr. Brewer said it was a well-known fact that the bottoms of fence posts decayed much more rapidly when on a hill than in a bottom. So it was with bodies. If buried on a hill, decay set in much sooner than when interred in a bottom, and this might furnish a reason why all bodies should be buried in elevated dry places.

Dr. Ames said a single fermenting pickle, when thrown out with other garbage, would kill a hog. The question of the utilization of garbage as manure was a question of great moment.

Dr. W. F. Barr, President of Abingdon (Va.) Academy of Medicine, said that it had been reported in different medical journals of late years, that typhoid fever had been caused by drinking cows' milk. He thought the subject one of great interest and worthy of careful investigation, for milk was used throughout the whole country. It was stated in the reports of cases referred to, that the milk used was from cows that had drunk stagnant water. He wished to inquire if any one thought it unsafe to drink or use the milk obtained from cows fed upon kitchen swill, or to eat the meat of hogs fed with it.

Colonel Waring spoke of manurial matter decomposing through oxidation. He gave an example of this which had come under his own observation He had sent a sample of earth-closet manure to an eminent chemist to ascertain how much manurial matter it contained. It was found to contain less organic matter than samples of fresh earth. He believed every particle of fæcal matter in the soil of the former was consumed as if it had been burned.

Dr. Ames asked Colonel Waring whether it would not do after a lapse of several days to use it for agricultural purposes.

Colonel Waring replied that, practically, the only way to make it of value was to apply it to the plant immediately, as was the custom with the Chinese and Japanese.

Dr. O. M. Wight, Health Officer of Milwaukee, said that he had sanitary charge of a city of one hundred and fifty thousand inhabitants. A Mecklenburg German had taken the contract to take away the garbage of the city, and fed it to his swine. It killed the swine. He then cooked the garbage and it still killed the hogs. He laid it to broken glass, pins and needles, etc., which were sometimes found in the garbage. But the hogs that it did not kill were a bigger nuisance than the dead ones.

Dr. Bell said Dr. Otterson, President of the Brooklyn Board of Health, suggests that, frequently rats were poisoned with arsenic and other poisons, and this poison getting into the garbage may have killed the hogs.

Dr. Brewer said that it might hold good ordinarily, but Connecticut arsenic would not kill hogs, rats, or anything else.

Dr. Otterson thought that if garbage could be dried it could easily be transported and used, but not to any extent in its liquid condition. Street sweepings might be sold to the farmers, if mixed with night-soil, by the bushel, and they would be glad to obtain it.

Dr. Hunt said, It is essential that garbage matter be removed while fresh. He was glad that Dr. Bell and the Boston paper emphasized this point. All knew that garbage was a very composite mixture. The plan of rag-picking, which is engaged in by so many on the streets, and from garbage barrels, must be dispensed with, as these rags are filthy and may carry contagion. As to the idea of utilizing garbage for agricultural purposes, it seemed to him feasible. It is easier to handle solid than liquid garbage matter. He spoke of the crematory system — that of burning such matter — as one presenting advantages, and he also found some good in the dumping boat system. He hoped some mode, however, would be developed of making garbage of manurial value.

Dr. Durgin, of the Boston Board of Health, said, There has been no unusual death rate among hogs in the vicinity of Boston to my knowledge, although they are fed, to a large extent, upon the material in question. This may be accounted for somewhat by the fact that nearly all of the garbage is collected and delivered to the farmers in a comparatively fresh state and entirely unmixed with other substances.

Farmers are generally quite particular about the quality and condition of this material when they receive it. We have an ordinance which requires that garbage and ashes shall be kept unmixed, in separate receptacles, and when the collectors find these substances mixed or other substances mixed with them, they reject the mixture, which must afterwards be removed, as a nuisance, by the party creating the same.

I do not advocate the use of garbage in feeding swine; I should be glad to see it utilized in some other and better way.

In answer to Professor Brewer I will say, that the removal of garbage, ashes, etc., by the city carts is limited; ashes made in manufactories, and all brick, mortar, and waste of any kind, the result of building or altering buildings; decayed or otherwise unsalable fruit or vegetables found at stores, are all removed by private parties.

Dr. Harris said that garbage should be separated from other material and be removed in covered vessels far from dwellings and populations. This was the way to make it inoffensive.

Prof. Tonrey, of Baltimore, gave additional examples of the trouble arising from the disposing of night-soil. In whatever way it had been disposed of, no provision had been made for preserving its most valuable ingredient. As the system now exists neither commercial nor agricultural benefit is obtained from it. He spoke of the idea of mixing night-soil and sulphuric acid with Mexican guano and the guano of the West Indies. These imported guanos, while possessing valuable fertilizing matter, do not contain the amount of ammonia and like valuable matter which is to be found in night-soil. The project is quite feasible, and he is sure this mixture, while fairly disposing of the night-soil, would form a manurial compound of great value, both commercially and agriculturally.

Dr. Folsom said garbage should be removed as a sanitary nuisance. Then if anything could be gotten for it, all right. He opposed privy vaults anywhere, and thought that in the country dry removal should be substituted. There are still about six thousand privy vaults in Boston, and these are being abolished as fast as possible.

Colonel Waring asked if removal by irrigation was not the best developed plan.

Dr. Folsom said it was a better sanitary plan than throwing it away, and was, in fact, the best plan. He thought the method introduced by Colonel Waring, after being used in England, was an excellent one. Sewerage is often opposed on account of the expense, yet he thought that, on the whole, it was the cheapest method in most cases.

The Secretary then gave an abstract of a paper prepared by Professor E. G. Janeway, M. D., of the New York Board of Health, on Some Points in Municipal Sanitation. (For paper see page 44.)

An invitation to visit the Hermitage was received from Dr. John Lawrence and accepted. The Association then adjourned to pay its respects to Mrs. Polk.

AFTERNOON SESSION.

The President, Dr. Cabell, in the chair.

The President announced that the following resolution had been adopted by the Executive Committee: —

> *Resolved*, That all resolutions designed for the consideration of the Association be sent in as soon as possible to the Executive Committee for classification, etc., that they may be properly presented to the consideration of the Association.

Dr. A. L. Gihon, Medical Director U. S. Navy, then read a paper entitled "The Protection of the Innocent and Helpless Members of the Community from Venereal Diseases and their Consequences." (See page 55.)

Dr. G. M. Sternberg, Surgeon U. S. A., said: —

Mr. President, — I feel that the forcible and eloquent manner in which my friend Dr. Gihon has treated this subject makes it quite unnecessary that anything more should be said for the purpose of arousing the interest of the Association and pointing out to it its duty, and I am sure that anything I could say, with this object, would seem weak and unprofitable after his stirring appeal. I shall therefore confine my attention during the few minutes allotted to me to a discussion of the practical question, "How can the necessary protection be furnished to confiding and unsuspecting young women, who look forward to matrimony and maternity as their happy destiny, unappalled by prospects of poverty, domestic cares, and the pains of child-birth; and to their unborn offspring, the future hope of the American people."

If, Mr. President, this subject were presented here from the selfish point of view which I believe has been the mainspring of legislative action in foreign countries, that is, the protection of men of the present generation from the sad results of their own licentiousness, I should feel that it was, perhaps, unworthy of the attention of this Association. But viewed from the higher ground to which Dr. Gihon has raised it, there can be no question as to our duty as sanitarians, as physicians, and as American citizens interested in the future welfare and progress of our country.

So far as I know, all remedies heretofore suggested have had reference to the surveillance of prostitutes. This may be, and probably is, a proper subject for legislation, but I doubt whether public sentiment in this country would admit of such legislation at present, except, possibly, in a few of the larger cities. But, sir, I would propose for the consideration of this Association and of the legislators of every State in the Union, a method of furnishing protection to the innocent victims of this disease which I believe to be in accordance with the principles of justice and with an enlightened public sentiment.

I would make every man and woman responsible for his or her misconduct, and would punish as a criminal any person who *knowingly* inflicts this disease upon another. I would have the punishment especially severe for any victim of constitutional syphilis who should contract the marriage relation, and would have such marriages illegal and of no effect. Is it not a criminal act to knowingly inflict upon another a loathsome disease which may not only blight the life of the individual, but may also be transmitted to his posterity? And if so, is it not the duty of the state to protect its citizens from such serious personal injury, and itself from the burden of supporting the disabled victims of the monster who *knowingly* inflicts it?

The prostitute, the reckless sailor or soldier, and the unprincipled libertine — victims of this disease — would no doubt be restrained to some extent from causing others to share in their misfortune if they were sure that punishment would follow such wanton injury. And, if not restrained by fear of punishment, the confinement which should be the penalty of conviction would at least prevent them for a time from repeating the offense, and some limit would be placed upon the propagation of the disease in question.

In order that all syphilitics might be fully informed of the nature of their disease and of the laws relating to it, I would have it the legal duty of every physician attending such cases to give this information, and would have a suitable penalty attached for non-compliance with this duty. Physicians might be furnished by the health authorities with printed circulars giving the necessary information; and, for their own protection in case a plea of ignorance is made by one of their patients brought to trial, might take a receipt at the time of giving this circular, which should be as soon as a diagnosis is made.

The man or woman thus instructed who should imperil the health and happiness of another too confiding person, by contracting the marriage relation, would richly deserve the severest penalty; and if such a marriage were declared illegal there can be no doubt that this offense against society and unborn generations would be far less frequent than it is, unfortunately, at the present day.

If it were known among prostitutes that one suffering from this disease, upon complaint being made against her, was liable to arrest and punishment for communicating it, and if the law permitted the sufferer to make complaint through the health authorities, not compelling him to reveal his name or appear in court, there can be no doubt that many syphilitic prostitutes would be compelled to adopt some other calling; and those who recklessly disobeyed the law would sooner or later be placed under proper restraint.

On the other hand, if unprincipled men were in danger of arrest and punishment upon the complaint of the poor creatures, whose miserable existence they would make still worse by inflicting a life-long injury in return for a momentary sensual gratification, then might we hope that a restraint would be put upon these wretches, which would to some extent neutralize their inhuman and selfish indifference to the health and happiness of others.

While this criminal indifference to the rights of others has much to do with the spread of syphilis, it is also true that ignorance of the nature of the disease and of the various methods by which it may be communicated (*e. g.* — from secondary lesions in the mouth; to the mother from her unborn child, etc.) is chargeable to a considerable extent with its propagation.

One of the first and most available restrictive measures would therefore seem to be the diffusion of correct information upon this subject.

If Boards of Health would publish circulars containing this information, and if every physician would give to each of his patients, suffering from venereal disease of any form, a copy of this circular, much good might be done in the way of preventing those not well informed upon this subject from contracting or communicating the disease in question.

I trust, Mr. President, that this subject, so forcibly brought to our notice by Dr. Gihon, will continue to engage the serious attention of this Association at each annual meeting, until some definite and practicable plan of action is devised, which we may hope to successfully urge upon the legislatures of the several States. And I submit that an essential part of this plan should be the making of marriage by a syphilitic illegal.

Dr. P. H. **Bailhache**, Surgeon U. S. Marine Hospital Service, said: While I cannot go quite so far as Dr. Sternberg in his recommendations, I fully agree with Dr. Gihon in everything he has said. The limitation, if not the eradication, of venereal diseases is a subject of vital importance, alike to the individual and the nation, and if quarantine can be legally established to prevent the introduction of certain contagious diseases, and isolation can be employed to guard against the spread of others, there appears no good reason why the same means may not be used in preventing the introduction and spread of a disease more disastrous in its results than any other contagious disease which gains a foothold among us.

If the right to limit the personal liberty of an individual for spreading one disease exists, the same right can be employed in limiting the spread of an equally contagious disease in the same manner, — and no one questions the contagiousness of syphilis, or that its spread is the result of personal contact. By what right any woman suffering with such a disease may not only live in freedom, but actually solicit victims, it is difficult to understand.

But it is not alone on shore that this disease must be stayed; Dr. Gihon has shown us how it afflicts the sailor, and I add my testimony, that the seamen of the merchant marine suffer in greater number from venereal diseases than from the hundred and odd other diseases with which they are afflicted.

The great objection offered to any plan for the limitation of this disease comes, paradoxical as it would seem, from the "moral element," — "licensing prostitution" is the cry from the pulpit and the religious press. In 1875, in a paper contained in the annual report of the Surgeon-general of the U. S. Marine Hospital Service, I suggested the following plan for limiting these diseases, and I believe with slight modification it is all-sufficient: —

"I. Prevent the introduction of venereal diseases from abroad, by so amending existing quarantine regulations as to include the physical examination of seamen arriving from foreign ports, — detaining the infected in hospitals designated for that purpose.

"II. Prevent the shipment of seamen suffering with venereal diseases (or other disability, rendering them unfit for duty) by requiring the physical examination of such as are bound to foreign ports, — with authority to send the diseased or disabled to hospital.

"III. Prevent local infection by establishing at our larger ports and inland cities free dispensaries for the treatment of venereal diseases, and for the free examination of those who may have been 'exposed' to them; and finally,

"IV. Arrest and detain in hospital, until relieved, all persons who, not availing themselves of the free dispensaries, continue to spread venereal diseases.

"Such regulations would be beneficial alike to all classes, by excluding foreign importations and diminishing private as well as public infection.

"The machinery necessary for practically carrying such regulations into effect in great measure already exists: Our quarantine officers can exclude its foreign importation; the Marine Hospital Service can prevent its ravaging our out-going vessels; and our Sanitary Boards can combat it at home by being placed in charge of the free dispensaries, giving them plenary power to arrest and detain in hospital those who continue to spread the disease.

"While it is not claimed that beneficial results will speedily follow, it is believed that it is a step in the right direction, striking at the root of a fruitful source of contagion, and that eventually it will prove a great blessing to the public health."

Dr. B. F. Gibbs, Medical Inspector United States Navy, said: —

Mr. President, — Before hearing the paper of my friend Dr. Gihon, which I may say has given me genuine pleasure, I sent my name to the desk, as it occurred to me that some interchange of thought would be valuable regarding the infecting capacity of syphilitic poison through vaccination. Although Cullerier and others decide this question in the negative, still there are numerous instances in which syphilization has undoubtedly been communicated by the process of vaccination. We may well leave this question, supposing it to be a debatable one, as it has not been touched in the paper, and address ourselves more directly to considering the best plan for arresting the spread of venereal disease. I may mention, in passing, that by means of a constant return to the original bovine lymph we eliminate every danger which might attend the use of humanized virus on account of the syphilization of its source!

Throughout the reading of this paper the sanitation of the prostitute seems to have filled the mind of the author. In the remarks which have followed, by gentlemen eminently fitted by reading and experience to give valuable information in regard to the arrest of the spread of venereal disease, I have been surprised that no reference has been made to *a precopulative examination of the man.*

The few remarks I have to make will be addressed to this subject. I can very readily understand why it is that gentlemen are inclined to regard this plan of arresting the spread of venereal disease as of little importance. The whole of our attention is directed to the *prostitute* by most works on hygiene. The source of most of our accurate information having heretofore been from French works upon the subject of prostitution, we are in these taught that we must seek the disease and its arrest in the prostitute alone, while the inspection of men is always regarded with aversion because it becomes degrading to the profession !

I know of no weaker argument than this on either moral or professional ground. For more than twenty years of my professional life in the navy these inspections and examinations are parts of my daily duties to the service. I accepted them when I first sought and passed my competitive examination for admission to the medical corps of the navy. Every medical man employed is almost daily required to make such sanitary examinations. The only objects in making these examinations are that the government shall not be deprived of the services of the man immediately after enlistment, and further, that he may not be a source of infection, a carrier of the venereal poison to prostitutes, a new focal point, so to speak.

Is it any more degrading to a medical man to make such inspections *immediately* before a man seeks to indulge his passion, than it is to do it some time before, knowing from witnessing the baleful result that the man *has* indulged his debasing passion, and will do it again ?

In one of the most recent works on prostitution, by Jaennel,[1] this subject of inspection of men is only referred to to be condemned. The reference in even this solitary instance is not squarely directed to a pre-copulative inspection as I would have, but to an inspection of the workmen of the manufactories, etc. It is translated as follows : —

> " *On general inspection of men.* — Many utopian ideas have been uttered on the subject of inspection of men, and some hygienists have gone so far as to propose that workmen in the manufactories should be visited regularly, as prostitutes are visited, and examined, and that certificates of freedom from syphilitic disease should be required as is done with reference to vaccination in civil life."

This is the only book in which I have found any reference to examination of men, and, as before remarked, he does not touch the evil with any effect of arresting its spread, but goes over the highways and by-ways seeking an infected man, examining, perhaps, a hundred men before he finds one infected, driving to most justifiable wrath and indignation ninety-nine men who were non-infected and yet submitted to this inquisition.

But the strangest inconsistency of the above writer (and it may have been observed in plenty of other works on hygiene) will be found in reference to his plan for arrest of the disease. While, as above, he deprecates the inspection of workmen, and of course all other inspections adjacent to the residence of prostitutes, at page 396 he proposes a plan for an international prophylaxis, whereby venereal disease should be denied, in the individuals affected, transportation to another country! In articles five and eight of above plan he proposes that sanitary visits shall be made by the physician attached to the consulate of a foreign country, on all merchant ships before departure, to determine whether any of the crew are infected with syphilis, etc. The examinations are to be charged for and most rigidly made! He requires also that they shall be made upon arrival at the destination, and in the latter case if yet infected they shall be properly disposed of in hospital. In both instances he recommends inspection of men. What for? To quarantine against a peculiarity of the foreign syphilitic poison? No. He seeks in men the carriers of the poison, which he wishes to arrest at the threshhold, before admission to the country and to intercourse with prostitutes. He knows that the infection of prostitutes is a secondary matter in seeking to arrest the spread of the disease, and all regulations made in regard to their moral conduct and physical examination concerns social order and the validity of prostitutes alone.

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[1] *De Prostitution dans les grandes Villes, au dix-neuvième Siècle, et de l'Extinction des Maladies vénériennes*, par J. Jaennel, p. 575.

In no instance can it be shown that foreign syphilitic poison is worse than our own. We seek to shut out what comes from foreign shores, but ignore that almost beneath our noses. If the true syphilitic poison can be evolved in no way other than by communication with men, and usually carried by the male generative organ, is this not the source of the disease? If this source is destroyed or corrected, we must annihilate the disease.

What then do I propose, accepting the inspection of men prior to the copulative act as the only remedy that will effectively combat the spread of the disease? I would in no instance relax the regular examination of prostitutes, because I believe that filth will generate, if uncorrected, a most virulent type of chancroidal disease.

In all large cities I would at once recognize the existence of prostitution, and license as many houses for this purpose as seemed necessary, submitting them to the strictest discipline. We must recognize the evil, and may as well take the first step, as it will be the only one which will cost, or in other words, "take the bull by the horns."

Parent-Duchatelet, in his great classic work on Prostitution,[1] says, "If, notwithstanding the laws, the pains, the public contempt, the brutality, of which they are often victims, the frightful maladies, the inevitable consequences of prostitution, public women are everywhere found, is it not an evident proof that they must be acknowledged (cannot be prevented), and are inherent in society itself?" We know that no prohibitive laws ever passed, in regard to prostitution, were ever enforced with any of the rigidity in which they were enacted. A more severe execution of them has been sure to increase the evil they were intended to destroy. With an opinion from such a high source, regarding this perpetual plague spot upon our social fabric, we may as well go at once to work, and with the terrible earnestness which the subject demands.

Having recognized these houses as above, as open to receive the visits of men, and fully equipped for business, no man should be admitted, not even a man servant, before nine o'clock in the evening, or after eleven. They might remain as long as they chose. Before admission to the main part of the house, the candidates should be shown into a suitable room or rooms. Here they should be inspected, and the discovery of any abrasion, open ulcer, chancrous or otherwise, discharge from the urethra, enlarged glands indicating either syphilitic infection, or non-infectious bubo, or any secondary symptoms whatever, should cause the man to be denied admission.

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[1] *De la Prostitution dans la Ville de Paris et dans les principales Villes de l'Europe.* Tomes 2, par A. J. B. Parent-Duchatelet, p. 340.

Any skillful surgeon, by having the man properly prepared when presented by an attendant, would make all necessary examination in from two to three minutes. A suspicious case, supposing there might be a rush of business, might be set aside and directed to await deliberation, or in his disgust he might change his mind and leave.

Any surgeon should be well paid for this duty, which seeks to secure the wealth of the nation, namely, the highest public health. No medical man need feel any repugnance at this duty more than any naval or army surgeon would feel at the ordinary performance of such duty at the rendezvous. Such examinations, made preliminary to sexual intercourse, would in the end secure the women against infection. It would relieve the hospitals from overcrowding with syphilitic women as well as men. There would be, with my plan, no carriers of the syphilitic poison, and of course could be no syphilitic prostitutes.

There can be no question in my mind that this weekly examination of women, with a view of finding ulcerations or patches in the many deep and invisible folds of the vagina, rectum, etc., is the height of absurdity. It is very much like running to lock the stable door after the horse has been stolen. Supposing the ulcerations always to be found, which is highly improbable, how can this relieve the man with whom she last had coitus? Had he been examined in a most hasty manner, she, the prostitute, could not have been infected, and the man might have been sent home with some wholesome advice; or the doctor might have treated him on the spot, and for which the man might have paid the five dollars he intended to have given the prostitute.

Each one of these recognized and licensed houses should be located so as not to interfere with the neighborhood, and should have in constant attendance a policeman day and night, to see that no one is admitted before or after the prescribed hours, or in the absence of the inspector.

This, Mr. President, is my plan. It is very simple, and if vigorously applied will stamp out syphilis in all of its forms. The plan of legalizing, inspecting, and restricting houses of prostitution will no doubt be opposed by many, on the ground that venereal indulgence will be made safe and easy, and if all fear of consequences be removed, there will be no other restraining power to prevent unpardonable excesses. In other words, men are now only prevented through fear of disease or social reproach, from unmitigated indulgence. This debasing privilege, which we thus seek to recognize and hedge about with safeguards to mankind against the pains and penalties of a horrible disease, will not cause any increase in the army of debauchers who blindly indulge their passions, and will have no weight against the high social privileges of our country. The higher moral sentiments of our natures would not be satisfied with the bestial mental night of a prostitute. The intellectual accomplishments, the physical beauty, and the moral and religious excellence of the pure women of our country cannot fail to satisfy the most indifferent man who seeks to fulfill a mission of his life and creation.

I will in this connection produce the opinion of Parent-Duchatelet. He takes the ground that the fear of syphilis does not improve public morals.

> "As to the fear of these cruel and shameful diseases being regarded as a divine punishment for the indulgence, experience proves every day how fanciful it would be to base upon this any hope for the improvement of public morals. Vainly did Mougeol propose to the International Medical Congress in 1867 that a plaster collection, figuring the results of venereal disease, should be placed in the antechambers of houses of prostitution. All hygienists accept the opinion of Parent-Duchatelet: 'Have the frightful diseases produced by prostitution for many ages, and the fear of contagion, diminished the number of prostitutes? Assuredly not. Everything proves to us that even the certainty of a still greater calamity will not diminish the evil. In this respect, when man is under the dominion of his desires, and blinded by his passions, he is more reckless and more stupid than the brute.'"[1]

Finally, I would be most distinctly understood as according the greatest liberty to the subject, but would at the same time exact the most rigid examination of both parties to this indulgence.

Dr. J. M. Keller, of Hot Springs, Ark., said: I hope some action will be taken by the Association on the very able paper read by Dr. Gihon, as it seems to me that the importance of it is not secondary to that of the consideration of ways and means to prevent the existence of yellow fever. The latter disease has in its visitations swept away many people. In its three last visits to the western part of this State, it has, in addition to the sacrifice of many lives, cost millions of dollars. It comes with a rush and hurries through its work of devastation and death, then leaves the country, may be, not to return in years. Not so with syphilis. It is ever among the people, making no distinction between the hovel and the palace, pervading every grade of society, leaving its fatal marks of inheritance alike upon the rich and poor, and knowing no geographical boundary, but insidiously permeating society as surely in the frozen regions of the North as in the sunny clime of the South, undermining the public health and doing more to shorten the average duration of life than all other inherited diseases known.

Living as I do where thousands flock to seek relief, I have probably a better opportunity of observing all the horrors of the disease than any of you can possibly have, and I therefore propose that the author of the paper be made chairman of a committee of five, to report if possible at our next meeting some more effectual plan of stopping the disease than has yet been devised.

[1] Jaennel, *De Prostitution dans les grandes Villes*, etc., p. 285, quoting Parent-Duchatelet.

Dr. Keller then offered the following resolution: —

Resolved, That a committee of five be appointed by the Chair to devise and suggest some plan looking to the control of the spread of venereal disease, with instructions to report at the next meeting.

The number being changed to six the motion was adopted, and the President appointed the following committee: Albert L. Gihon, M. D., Medical Director U. S. Navy, Chairman; J. M. Keller, M. D., Hot Springs, Ark.; George M. Sternberg, M. D., Surgeon, U. S. Army; D. C. Holliday, M. D., New Orleans, La.; Preston H. Bailhache, M. D., Surgeon U. S. M. H. S.; William E. Griffiths, M. D., Brooklyn, N. Y.

CONSTITUTIONAL AMENDMENTS.

Dr. Folsom presented a report of the Executive Committee on proposed Constitutional Amendments, recommending the adoption of the following resolution: —

Resolved, That the Executive Committee recommend to the Association the rejection of the proposed amendments to the Constitution; that an advisory committee, of which the President of the Association shall be chairman, be nominated by the Executive Committee for appointment by the President, to be confirmed by the Association; this committee to be constituted of one member from the National Board of Health, one from each State, one from the medical departments of the Army, the Navy, and the Marine Hospital Service, and the Commissioner of Education.

The resolution was adopted.

EVENING SESSION.

Dr. Hunt read a paper entitled, "May not Yellow Fever originate in the United States? An Etiological Study of the Epidemic at Savannah in 1876," by Dr. Alfred A. Woodhull, United States Army. (See page 89.)

Dr. T. J. Tyner, of Memphis, Tenn., then read a paper entitled, "Etiology of Yellow Fever in Memphis, with Remarks on Quarantine." (See page 147.)

Dr. Early, of Kentucky, regarded the paper of Dr. Woodhull as the keynote of future developments. The case of the sailor bore him out in an opinion he had entertained for years. Every malarial region in the country was a sleeping volcano to the people residing there. He believed that the yellow fever germ depended upon climatic influences, and that once in existence it might be kept a thousand years and not be killed. Frost did not kill the germ, only killed that one development of it, and the germ lived to await new influences, which were to warm it to life again. Under proper conditions and restrictions, however, the yellow fever need never appear in this country again.

Dr. Hargis, of Pensacola, said: —

Mr. President and Gentlemen, — Since hearing the very able Annual Address of the distinguished President of the Association, I opine that there are scarcely any important points, connected with the matter in hand, that require much discussion, especially in reference to the practical application of the means of prevention. However, for the sake of correct historical records, and the honor and dignity of the profession, the primitive origin of yellow fever and the precise location of its habitat should be definitely settled, and this proposition alone has prompted me to take a part in this discussion to-day.

I propose to say a few words, firstly, with regard to the history of yellow fever, its habitat and habitudes, and exciting or primary cause, and then something about contagion and the germ theory. In reference to the early history of yellow fever, the further we trace it back, the more obscure, uncertain, and conflicting are the various accounts given of diseases supposed to be similar to, or identical with it, until we lose cognizance of every malady that might be identified as being in any respect related to it; except in manifestations of pyrexia, communicability, and malignant qualities, which are not peculiar to any particular disease of a febriferous character. We shall therefore pay no attention to accounts given by Hippocrates of a fever in which a "black vomit foreboded ill," as a *black vomit* is often associated with fever of a malarial character. We shall also make of no account the epidemics of the middle ages, so well described by Hecker and others, and ignore all that has been said or conjectured with reference to Columbus in 1493 and 1496, and even down to about the second decade of the seventeenth century.[1] For although the description given of them by writers of that day would by no means justify even a supposition that any one of them might not be identified with the disease under consideration, for the sake of historical truth they should be accepted with due allowance. But the dawn of the true history of yellow fever is accredited by Gilchrist to the writings of Père Dutertre, who was first to describe an epidemical malady that occurred for the first time in the West Indies in 1635. It manifested the symptoms, and progress, and termination of a disease identical with those which characterize yellow fever at the present day. He said it was a new disease, and termed it "the pest unknown previously in these (West India) islands." He attributed the introduction of the disease into those islands to some ships, and particularizes the ship *La Boucf*, from Rochelle, France, where neither yellow fever nor any other similar malady ever existed. It therefore originated in these vessels in transit on the high seas, from local sources of contagion engendered in the ships themselves.

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[1] I have no doubt but that the cause of the malady by which Columbus's men suffered with such great mortality at St. Domingo, and which Columbus, in a letter to the King of Spain, "attributed to the air and water," was brought with them in the holds of their vessels. They were over two months under the tropics, and on reaching the land it became necessary to open the hatchways and overhaul, to use a sailor's term, their stores, clothing, bedding, and other perishable articles that had been shut up in the close, unventilated compartments of the vessels. The disease was violent and sudden in its attack, and the recovery of the patient became hopeless soon after its onset or incipiency; and hence it is reasonable to infer that the disease was identical with yellow fever, and that the morbific principle of that fatal malady was caused by emanations from the noxious materials that had been pent up in the close, dark, dank, and noisome holds and recesses of the vessels themselves, and rendered malignant and pestiferous by the accumulation of calorific rays of a tropical sun. The cause of the disease could not reasonably be ascribed to the "air and water" as the principal factors, and it could not have been produced by any deleterious qualities of the "delightful odors" emitted from the innumerable flowers that "flung their sweetness upon the desert air," and gave a lively fascination to the "rich and varied scenery of that sunny isle." It could not have proceeded from any noxious exhalations from the virgin soil, for that had not yet been disturbed by the rude implements of the savage Carib. It is true, however, that the soil was cultivated in various parts of the island by the natives; but Edwards observes, "As the West India isles were not without culture, so neither were they generally noxious to health." To what other source, then, could we look, with a reasonable expectation of finding the *fons et origo* of the epidemic among Columbus's men, but within the unwholesome cavities of the ships, amongst the bilge water, the débris of a mixed freight, and dead rats and mice and vermin of various kinds?

Yellow fever was introduced into Martinique, St. Domingo, in 1688 by the ship *Oriflamme*, from Siam, in Asia, where no such malady was ever known to exist, and it was called Maladie de Siam;[1] but it should have been termed, in accordance with the nomenclature then in use, Maladie de Oriflamme. The contagion thus introduced spread in the town, and likewise to all the vessels in the harbor. The disease was soon after transported to France, Spain, and the United States, — Charleston, New York, Philadelphia, and other towns of the colonies of the continent. Again, in 1792, yellow fever was introduced into Georgetown, in the island of Grenada, by the ship *Hankey*, from Boulam. The disease, according to Chisolem, who was at Georgetown at the time, originated from local sources of infection within the vessel itself. The malady was first communicated to a great many vessels in the harbor, invaded the town, and extended into the island, and thence to Jamaica, St. Domingo, Barbadoes, Dominica, and Antigua, and the same imported to Charleston, New York, and Philadelphia, etc. After this, the monster found a congenial soil and climate in the West Indies, and became domesticated there. The name of Maladie de Siam was dropped, and the disease was long called Fièvre de Boulam, or Boulam Fever; hence the name African fever, and subsequently the names pestilential or malignant fever was applied, and finally that of yellow fever, which it retains.

Now, these very brief outlines of the early history of yellow fever show very conspicuously the nautical origin of that destructive malady, and show also very clearly its communicability, portability, and mode of propagation.

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[1] M. Moreau de St. Mary, "an historian of great candor and integrity," says in his *Topographical and Physical Account of the Island of St. Domingo:* "In the year 1690, a bloody revolution took place in the empire of Siam. The French established there embarked for France in the ship *Oriflamme*, commanded by M. de Lestrilles, and two ships of the Indian Company, called the *Loure* and the *St. Nicholas*. On their voyage to France, they were forced, by stress of weather, to go into Fort Royal, in Martinique. They brought with them a pestilential fever, of which M. Lestrilles and a great part of the crews died, and which, spreading into the town of Fort Royal, carried off a large number of the inhabitants. I admit that Labat mentions that this ship 'touched at the Brazils, where she became infected with the disease which reigned there six or seven years.' His, Labat's, statements, however, says Gilchrist, seem to rest altogether on the belief then prevalent as to the circumstances." Why, then, was it called by common consent Maladie de Siam? Now, there are two notable facts which render the possibility of the *Oriflamme* contracting the infection from the Brazils doubtful, at least, namely: That in the writings of Castelboredo, the earliest writer on the *vomito prieto* of South America, no reference is made with respect to the disease occurring so early in Brazil as 1688 or 1690. He wrote in 1753, at Carthagena. M. de St. Mary said nothing about the disease ever having existence in the Brazils as far back as 1688 or 1690.

With regard to the cause of yellow fever, or the pathogenic agent that produces the disease. Twenty years ago (1858) I had occasion to make the following remarks (incidentally) in a communication to the "New Orleans Medical News and Hospital Gazette," on the Communicability of Yellow Fever. "With regard to the origin and cause of yellow fever, much diversity of opinion exists in New Orleans and elsewhere, which may be 'found on paper.' One says yellow fever originates in New Orleans, independently of importation, and is caused by a hot sun and whiskey; another, that it is not indigenous, is introduced from abroad, and requires a certain (unknown) condition of the atmosphere for its propagation and spread. Others agree with the former, so far as relates to its local origin, but assert that it is caused by noxious exhalations from the city; another denies this emphatically, and declares that a vitiated atmosphere has nothing to do with it, while another, equally earnest, attributes it to barometrical vicissitudes, or a certain meteorological condition indicated by a high dew point. Another smiles at the absurdity of all these theories, and affirms that the cause of yellow fever is to be ascribed to a febriferous atmosphere, and so on; but to cap the climax, 'a new light arises, protesting against all the theories and hypotheses that were ever promulgated, and avows that *vomito prieto* is of domestic origin in America, and caused by eating 'possum!' Now, after all these various contradictory and absurd opinions are collected together, analyzed, and compared with one another, and with the results of my observation, my judgment irresistibly leads me to the conclusion that the cause of yellow fever cannot be attributed to terrene emanations (from whatever source) nor any condition of the atmosphere, whether electric, hydrometric, barometric, or thermometric, nor to any nor to all these conditions combined, as found diffused through the air *on land — on land*, I say; and I am forced to the conviction, be its work of desolation wherever it may, *it is neither indigenous to this country, nor a native of any foreign clime.* I assume that it is in the *holds of vessels* sailing within the tropics a certain period of time, that are to be found the *materials* in which the morbific principle of yellow fever is produced, and from it, under favorable circumstances, disseminated on reaching inhabited shores within certain degrees of latitude, or wherever it finds a genial soil and climate, and under certain (peculiar) conditions of the atmosphere. Few or none will deny that yellow fever has often occurred on board ships at sea, far away from land, that had never touched at an infected port, and therefore under circumstances that forbid the supposition that it could have originated from any other focus of infection than that which existed within the vessels themselves. La Roche has adduced ample and irrefragable testimony to this fact; but by what process of reasoning he arrives at the conclusion that the noxious effluvia generated in the holds of vessels are identical in nature with that which is produced on land (free to the open air), I cannot conceive. The combination of circumstances under which noxious gases are eliminated or morbific materials formed from the timbers, bilge water, and débris of an assorted cargo of a ship, are peculiar; materially different from those upon which depend the exhalation from filthy cities, prisons, emigrant vessels in temperate latitude, and paludal districts. Indeed, it is so palpable to the perception, that it were inconsistent with the plain dictates of common sense to suppose otherwise." This is what I said twenty years ago, and it is just as applicable now, in the discussion under consideration, as it was then. Filth causes yellow fever, but not in the open air *on land*, from any source, or it would have appeared in New Orleans before 1796; for sanitation was then scarcely thought of, while that city had for years been reeking from filth; nor in Charleston previously to 1732, and Philadelphia anterior to the same year, and other cities in a similiar condition. No, the idea of the emanations from filth, as they exist in the air *on land*, is a delusion, an egregious error. Filth *per se*, nor even associated with an epidemic constitution of the air, free from yellow fever germs or virus, will not cause the disease *on land* anywhere on the face of this globular mass we live on, not less certain than it will not cause small-pox, or large pox, or measles, without the germ or morbific principle.

A French author, many years ago, while speculating with regard to the local origin of yellow fever on land, and referring to the production of the disease in certain localities bathed by the sea, asks, "Can this cause of infection, acknowledged to be indispensable for the production of yellow fever, be maritime? We have seen," he continued, "this disease break out sometimes on board vessels at sea, without their having had any direct communication with land; and then it may be demanded if a focus of infection sufficient to explain the origin of the disease could not be created from some particular source on board." M. Lefort is one of the first who admitted that the cause of yellow fever might easily reside in ships themselves. Professor Forget, who in his "Naval Medicine" has devoted to yellow fever an excellent article which marine physicians may consult with advantage, expresses himself on this subject in the following words: "In the ship's hold there exist powerful causes of infection, due to the sea water which becomes corrupted by dissolving putrid materials, both vegetable and animal, such as dead rats, and those insects which infest ships to an innumerable extent in the colonies, called *ravets;* we see, then, that after a protracted anchorage, when this filth is stirred up, deleterious emanations may escape from them." I shall quote from the same author some facts in favor of this theory. In 1821 the corvettes *Diligent* and *M.* were obliged to be discharged at Martinique, because there were not men enough to man them, and also to save the remaining unfortunate individuals of their crew; and such was the activity of the deleterious principles which were found in these vessels, that the men ordered to purify it were, many of them, seized with yellow fever. We read in the thesis of M. Fribourg, chirurgeon of the brig *Antelope*, that in 1826 the unstowing the hold of the vessel was immediately followed by the explosion of a violent epidemic yellow fever, when there had been no epidemic at Fort Royal. At the request of the surgeon, the equipage was landed, and from this period there was no more sickness, yet of three men left on board, to guard the vessel, two were attacked, and one of them died. The ship was ventilated, purified, and bleached with lime, and the crew returned to the vessel with impunity. Similar observations have been made in relation to the brig *Abeille*, the schooner *Topaz*, and the frigate *Astrea*. The barque *Indefatigable*, of which Dr. Fleury, of Rochefort, was chirurgeon major in 1816, presents a new and striking example of the fact. The corvette *Bacchante*, of General Leclere's division, arrived at Saint Domingo with its ports condemned; the yellow fever broke out in the vessel with great intensity; the ports were opened, and the epidemic ceased. These facts are so striking that they even seem exaggerated; hence Dr. Reider, of Vienna, says that the yellow fever originates from, and is the product only of navigation; that this is the true and only source of the yellow fever; lastly, that those emanations which arise from the water that becomes decomposed in the holds of vessels are the *specific cause* of yellow fever, and that the vapors thus confined attain to a degree of putrefaction or malignity which putrid and marshy exhalations *cannot acquire in open air*. La Roche, who is the *apotheosis* of many who are content to clothe their own minds with the thought of others without reflection, brings forward in bold relief ample proofs of the nautical origin of yellow fever, but fails to see and appreciate the peculiar circumstances under which the malady is produced, refers the cause to malaria, and refuses of course to admit that it is contagious or can be transmissible by things, but said, "If it could be shown that the disease could be propagated by fomites, it would be a strong presumptive evidence of its communicability;" and in spite of his immense bibliography he ignores entirely the numerous instances recorded by Lind, Strobel, and others, of the portability of yellow fever poison in dry goods, bedding, etc. I said that his conclusion with regard to the non-contagiousness from the evidence before him is illogical, and so it is, unphilosophical. Copland's article, in his "Medical Dictionary," on what he termed *Pestilentia Hæmagastrica*, is one of the best productions that ever emanated from the pen of any author, while with all his sagacity he could not see the habitat of yellow fever when even one link in the train of association of ideas would have led him to discover the original and prime source of the disease in the ship's hold. He said, after much speculation, "I have suggested as to the not improbable origin of the distemper, in the concentrated emanations from the bodies of a great number of negroes confined in the close, humid, and hot holds of slave ships." If this opinion, he continues, "as to the probable origin of the infectious poison be not admitted, *there is certainly none others deserving greater confidence*." If he had excluded the negroes and quality of the ship, he would have hit the truth precisely, namely, *that in the hold of* ships, under certain circumstances, exists the *materies morbi* of yellow fever in its *primitive perfection*. There in the hold of a ship, I repeat, are the source and origin of the monster which has, for over two hundred years, desolated our cities, and baffled the most sagacious inquirers as to whence it proceeded, or whither it came.

With regard to contagion arising *suâ sponte* on ships, the doctrine of a *contagium vivum does not* militate against it; on the contrary, I hold the converse to be true, yet, for argument sake, I accept the germ hypothesis.

Pasteur says in his latest work that these organisms (disease germs) could not be classified, as attempted by Kohn and Billroth, from the fact that they undergo transformation, and this transformation depends upon the nature of the *pabulum* in which they may fall. If, then, they can undergo transformation, why not also undergo a change in their physical qualities? why may not germs from the frigid zone, or anywhere else, when their habitudes are changed to the noxious hold of a ship, change their qualities during the genetic process, from first innocuous or innocent undeveloped monads to contagious germs? I ask, Why not? I would answer if the germ theory be true, they do; or act as mere carriers. Let us attempt to prove it. Some years ago in Michigan there was a starch factory, near which was a large bank of potatoes, which entered into a state of decomposition, and emitted an effluvium which gave rise to a fearful epidemic amongst the people of that locality. It was very fatal. Many fled to the open country, carrying the seeds of the disease in their bodies, and were stricken down; some of them were visited by their neighbors, who had not been away from their homes, and, of course, never exposed to the *contaged* (?) locality; the visitors on their return home were stricken down with as certain a fatality as those who came out of the sickly locality. I could state many such instances that have fallen under my own observation with regard to yellow fever, but it is not necessary; *ab uno disce omnes*. From this single instance the whole may be inferred.

Dr. J. M. Keller said: —

Mr. President, — Had I wanted to write an article proving the *importation* of yellow fever into Savannah, I do not think I could have produced more conclusive proofs than are contained in the lengthy paper just read, a paper upon which very great labor has been bestowed to prove that the disease was *not* imported into the city of Savannah, but that it *originated* there or was indigenous.

The writer emphasizes the fact that the only vessel then in port from any infected conntry came in with no cargo, was perfectly clean, had only a small crew, and they, I believe, all protected by having once had yellow fever. These statements, I say, are emphasized, but the author barely mentions the fact that there was ballast in the vessel brought from some port in the infected latitude. That ballast, we are told, is composed of clay, or earth and gravel. Could the crew of that vessel have selected any material more likely to convey the germs of the disease than earth or clay, from, it may be, the immediate vicinity of yellow fever hospitals, or of privy vaults or sewers leading from infected premises? I would like to ask Dr. Sternberg, who went to the very port from which this vessel arrived at Savannah, whether or not he had occasion to examine the spot or locality from whence the ballast was taken. Dr. S. answers yes, and that the vessel could scarcely have taken on any cargo which would have been more certain to convey the disease.

The writer, as further proof of his ideas that the disease *did* originate in Savannah, lays stress upon the fact that after the first case occurred, or may be the second or third case, the next cases following occurred some distance away from the vessel and away from where the first developed. This certainly cannot be offered as any argument or proof against the fact that the ballast in the vessel in question was the original cause. In 1867, in Memphis, Tenn., I saw the first case of fever which occurred. A policeman had boarded and slept one night on a New Orleans boat coming from that city. In a day or two after, he was attacked. His house was on an elevation just southwest of and overlooking a miserably filthy hollow or flat, in which were densely packed several hundred poor people. This man died, and for ten or twelve days nothing more was heard of yellow fever existing, though all naturally and anxiously feared that the inhabitants of the hollow or flat would be swept out. Just twelve days after the death of the policeman, away across and beyond this valley, nearly a mile in a northeasterly direction, in the highest and healthiest portion of the city, a number of cases occurred in the families of the neighbors of a friend of the dead policeman, who had frequently visited him during his illness, and it was not until about twenty days after the first case that the disease attacked the people in the valley and swept it as with an army. But, sir, I am reminded that my time is up, and I cannot notice some other points in the paper which go to prove the reverse exactly of what the writer intends to sustain, and I simply repeat that the paper, in my opinion, is a very strong and irresistible argument in favor of the importation theory.

Dr. Elliott said that he thought the complete facts and evidence as to the Savannah epidemic did not carry out the ideas advanced by Dr. Woodhull in his paper.

Dr. Sternberg said the ballast came from an island near Havana.

Dr. Hunt said that the point was plainly made in the paper that the ballast taken could not be infected with fever. The paper also showed that the writer believed the fever resulted more from filth than from malaria.

Dr. Holliday, of New Orleans, said facts could be garbled and made to prove any theory that might strike the fancy. Dr. Woodhull plainly states his facts in evidence, and his views, and yet some, in commenting upon them, assume that he has said what he does not say. New Orleans had been made to bear the blame of importing every case of fever in this country, and undeservedly. No one could claim that the fever in Memphis this year was imported.

Dr. W. G. Austin, of New Orleans, said the ballast referred to in Dr. Woodhull's paper came from an infected island. Ballast, as was proven by the Yellow Fever Commission sent to Havana, would convey the poison. His long experience convinced him that the disease was exotic, — not indigenous to this country; you do not require fresh importation every year to have an epidemic. The poison can be wintered over; the disease checked by frost, but not necessarily destroyed. Sporadic fevers may, and surely do, appear the succeeding years if the climatic conditions are favorable to the spread of the disease. These conditions should be, can be, and must be prevented, or an epidemic is the result. What will prevent it. Just what prevented it in New Orleans this year, rigid sanitary measures by the State Board, aided in every way possible by the National Board of Health, the Auxiliary Sanitary Association, and the City Council. He wished to say here, but for the means furnished by the National Board of Health to the State Board, an epidemic could not have been prevented in New Orleans. These are facts that sanitarians want: how to prevent yellow fever, not conjecture to sustain a previous bias. If you wish to learn the detail of the work done in New Orleans by the State Board, with the means given by the National Board, you are referred to a detailed report given to Dr. Bemiss by Sanitary Inspector Bailey, which will be published by the National Board of Health.

DR. HOWARD, of Baltimore, thought there were far too few facts given, and given too carelessly. The great question is, how to prevent the fever, the one on which we want most information, and on which we have received least.

DR. A. N. BELL, of New York, stated that the relations of yellow fever to filth were more common and more persistent in connection with ships than under any other circumstances whatever. For example, a ship may have been engaged in running from Havana to New York this year, and become filthy, and next year have her first outbreak of yellow fever on approaching New Orleans, or other places of climate congenial to the disease; or even after two or three years, if not indeed perpetually at convenient seasons, whenever supplied with fresh subjects, so long as she is permitted to house in and transport infected filth. The only remedy for such conditions is the thorough inspection and cleansing of all vessels at the port of departure, before cargo is allowed on board. This criminally common filthy condition of ships, Dr. Bell thought, fully accounts for the mid-ocean outbreaks of yellow fever, and the so-called nautical origin of the disease by some recent writers.

DR. HARGIS mentioned cases where yellow fever broke out on board of ships in mid-ocean, which had not been exposed to any infection whatever.

A paper on the Etiology of Yellow Fever, prepared by Dr. W. H. Stillwell, of Kentucky, was read by Dr. Singleton.

DR. CAMPBELL, of Augusta, Ga., said he found himself in a sea of erudition since the paper was read, and would confine himself to his own ideas. He did not believe in the filth production of fever; he did not think the disease indigenous to this country. The germs were either imported shortly before the fever appeared, or a year or more before. These were laid away and in time produced a crop of fever. Filth, if piled up to the second story window, could not produce fever unless the seeds of the disease were there.

DR. JULIUS WISE, of Memphis, said he would not assume that yellow fever was indigenous, for it seemed to be the unpopular side, but it would be well to look at the facts. In 1878 the importation theory was accepted, but facts pointed out that there were cases of malarial fever, etc., before the claimed importation cases which afterwards proved to be yellow fever. He knew there were cases in 1879, before Mulbrandon's case. There was fever in May, June, and February. There was yellow fever in Memphis all last winter. At Concordia the only goods that had been received from Memphis was a sack of coffee. Those who handled the coffee escaped, while those who did not were taken with the yellow fever. This was curious. Early cases in Memphis were not noted, while malignant malarial fever was common. If no epidemic had occurred, no one might ever have known that there had been fever in Memphis this year. In small towns frequently there were malignant fevers. He questioned if these were not yellow fever.

The Association then adjourned to 9 o'clock Thursday morning.

THURSDAY, NOVEMBER 20.

The Association met at 9.30 A. M., the President, Dr. Cabell, in the chair.

Prayer was offered by Rev. Dr. T. G. Jones.

Dr. Lindsley read an invitation from the lessees to visit the penitentiary.

Several new members were elected.

ELECTION OF OFFICERS.

The President stated that it was not the habit of the Association to make *viva voce* nominations, and the ballots were of an informal character. The vote would therefore be taken for the nomination of candidates for President.

Dr. Hunt and Dr. Gihon were appointed tellers.

The following nominations for President were made: Dr. J. S. Billings, 52; Dr. C. D. Holliday, 6; Dr. J. B. Lindsley, 2; Dr. Hunt, 2; Dr. Kedzie, 1; Dr. Cabell, 2; Dr. Bemiss, 2; Dr. Choppin, 3; Dr. Folsom, 1; Dr. Campbell, 2; Dr. Rauch, 2; Dr. E. M. Wight, 1; Dr. C. D. Wright, 1; Dr. C. B. White, 1.

DR. HUNT moved that the Secretary be instructed to cast the vote of the Association for Dr. Billings. Carried, and Dr. Billings was declared elected.

The nominations of candidates for First Vice-president were as follows: Dr. Choppin, 30; Dr. C. B. White, 23; Dr. J. B. Lindsley, 20; Dr. Holliday, 7; Dr. Folsom, 4; Dr. Bemiss, 2; Dr. White, of New Orleans, 1; Dr. Wight, 1; Col. Waring, 1; Dr. Turner, 1.

The first ballot stood: Choppin, 45; C. B. White, 29; J. B. Lindsley 20; Dr. Bemiss, 3; Dr. Plunket, 3; Dr. Holliday, 3.

Second ballot: Dr. Choppin, 60; Dr. C. B. White, 52.

Dr. Choppin was declared elected First Vice-president.

The following nominations were made for Second Vice-president: Dr. Lindsley, 34; Dr. Kedzie, 9; Dr. Folsom, 9; Dr. C. B. White, 9; Dr. Hunt, 6; Dr. Plunket, 3; Dr. Griffin, 3; Dr. Baker, 3; Dr. Thornton, 2; Dr. Gihon, 2; Dr. Ames, 1; Dr. Keller, 1; Dr. Tadlock, 1; Dr. Thompson, 1; Dr. Wight, 1; Dr. Wright, 1; Dr. Dunlap, 1; Dr. Choppin, 1; Dr. Wirt Johnston, 1; Dr. Breysacher, 1.

DR. BILLINGS announced that he was authorized to withdraw Dr. Lindsley's name. He desired, after the election of Second Vice-president, to move that the Secretary cast the vote of the Association for Dr. Lindsley for Treasurer. For the first time in the history of the Association financial matters had been made easy, and it was mainly due to Dr. Lindsley, the Local Secretary. It was necessary for the welfare of the Association that he should be elected Treasurer. The early publication of the transactions of the present session of the Association would, through his efforts, be fully assured.

First ballot: Dr. Kedzie, 46; Dr. Folsom, 21; Dr. C. B. White, 14; Dr. Hunt, 6; Dr. Wight, 1; Dr. Tadlock, 1; Dr. Bell, 1.

Dr. R. C. Kedzie, of Lansing, Mich., was declared elected Second Vice-president.

Dr. Billings moved that the Secretary cast the vote of the Association for Dr. J. B. Lindsley, of Nashville, for Treasurer, which was carried without a dissenting voice.

While the ballots were being taken, Dr. William H. Brewer, of New Haven, read a paper "On Rotting Wood." (See page 66.)

NEW ORLEANS THE PLACE OF MEETING IN 1880.

Dr. Billings, on behalf of the Executive Committee, read invitations tendering the hospitalities of Evansville and New Orleans to the Association for its next annual meeting.

All the medical associations of New Orleans, and the municipal authorities, together with the health bodies of Louisiana and the Governor, united in an invitation to the Association to make their city the place of the meeting of 1880.

The New Orleans invitations were accepted by an almost unanimous vote, on motion of Dr. J. M. Keller, of Hot Springs, Ark., seconded by Dr. Elisha Harris.

Dr. W. D. Mussey extended an invitation to the Executive Committee to hold its next meeting in Cincinnati.

Dr. J. D. Plunket, President of the Tennessee State Board of Health, then read a paper entitled "Cotton as a Fomite." (See page 84.)

Dr. G. B. Thornton, President of the Memphis Board of Health, then read a paper on "The Yellow Fever Epidemic in Memphis, 1879." (See page 111.)

THE EXECUTIVE COMMITTEE.

The following Executive Committee was elected: Dr. C. B. White, New Orleans; Dr. J. L. Cabell, Virginia; Dr. E. M. Hunt, New Jersey; Dr. J. D. Plunket, Tennessee; Dr. C. F. Folsom, Massachusetts; Dr. A. L. Gihon, United States Navy.

The Association then adjourned until 7.30 P. M.

EVENING SESSION.

The Association met at 7.30 P. M., the President in the chair.

Dr. Henry Frazer Campbell, of Augusta, Ga., read a paper entitled "The Yellow Fever Quarantine of the Future." (See page 131.)

Before beginning the discussion of the above paper it was stated by the President that ten members of the Association had signified a desire to take part.

A motion was adopted that each speaker be allowed ten minutes, and that no extension of time be granted.

DR. HOLLIDAY, of New Orleans, began by defining the position which the physicians of New Orleans now occupy as a solid phalanx upon the question of quarantine. They are, he said, very nearly of one opinion in regard to it. All believe that quarantine is demanded. All believe that the provisions of a judicious quarantine are calculated to meet the danger of the fever being brought into the city from infected places. Opinions differ on the question whether yellow fever can appear again in the future without a fresh importation. Dr. H. himself believes that the disease has now become endemic, and, under favorable conditions, will be reproduced, even if there should be no fresh importations. Still he is willing that there shall be a quarantine, but demands that it should be a quarantine directed by intelligent reason. If a vessel known to come from an infected port arrives, let men of experience and intelligence determine what preventive measures are necessary in each case, and have power to enforce such orders as they deem requisite.

It is agreed that yellow fever may be carried from place to place — but *how* is it carried? *Not* by persons, but by goods, clothing, cotton, and other things of a porous or absorbent nature. He agrees fully with Dr. Campbell as to the uselessness of personal quarantine, but the trouble is that passengers *will* carry with them baggage and personal effects. If a reasonable quarantine shall be established, the time will soon come when the existing opposition will almost entirely cease, and its inconveniences will be so diminished as to be no longer a serious objection.

DR. J. P. DAKE, of Nashville, said he had sent his name to the President merely that he might ask what steps had been taken to prevent the spread of the disease before the citizens were advised to leave Memphis. He would allow Dr. Thornton, President of the Board of Health of that city, part of his time to answer the question.

DR. THORNTON replied that it was not the intention of the Board of Health to let the fact be known that there had been a case of fever, but to publish it in the mortuary report. There was such alarm, however, that a card was published giving the facts in the case. Clothing, bedding, etc., of patients were burned. They had no means at command to compel depopulation or isolation. Disinfection was resorted to in a mild degree.

DR. J. H. RAUCH, of Illinois, said that in 1873 yellow fever was brought to Cairo, Illinois, in cotton, and was carried to Centralia, one hundred miles in the interior. He read the following letter addressed to him as evidence of this statement: —

NASHVILLE, *November* 19, 1879.

DR. J. H. RAUCH: —

Dear Sir, — In 1873 my brother was clerk on the Illinois Central wharf boat at Cairo. We were handling quite an amount of cotton that reached us, principally from Shreveport, La., and Memphis, Tenn., by river. He was in direct contact with the cotton, as well as two or three other clerks, who all sickened and died with what we subsequently pronounced yellow fever. Thereupon an order was issued prohibiting us from receiving cotton, particularly from Shreveport. My recollection is that there were eighteen deaths in all that it was claimed were traceable to the same cause, in Cairo in that year.

Yours truly, JAS. JOHNSON,
General Southern Agent Illinois Central Railroad.

Dr. Pinckney Thompson asked if Dr. Rauch was certain the cotton had brought the infection to Cairo.

Dr. Rauch said he was. It was so stated in the Surgeon-general's report. He did not know it of his own knowledge, but what he had been told.

Dr. Thornton said he did not think Dr. Rauch had sufficient evidence to prove that the contagion resulted from the handling of cotton.

Dr. A. N. Bell, of New York, remarked that he would begin what he had to say on this subject by offering the following resolution for the consideration of the Executive Committee : —

Resolved, As the sense of the American Public Health Association, that we have with eminent satisfaction heard the determination of the people of Memphis to institute such means of practical sanitation as may be deemed to be essential for the redemption of that city from yellow fever, and that we will, individually and collectively, exert ourselves in the promotion of the work.

Dr. Bell said he had listened with great interest to the papers read and their sentiments. He sympathized deeply with Memphis, but he felt constrained to say, from his own observation, that he had never seen a city in such an abominable unsanitary condition as Memphis. Its condition was revolting, and the people of that city were deeply afflicted. In the epidemic of 1878, 20,000 people had fled from the city. Of the 19,600 that remained, 17,600 had had yellow fever, and 5,150 had filled untimely graves. Of the 19,600 who remained in the city only 6,000 were white people, and of these the enormous proportion of 4,204 died ; 13,600 were colored people, and of these 946 died. He believed there was not an individual who was left in the city who had not divided his money and his lot with the sick and dying. At such a time there was no opportunity for the removal or even the notice of the filth of the city. He did not, however, hold the people of Memphis as being wholly responsible for the condition of that city. At the beginning of the epidemic last year, it was probably in no worse condition than several other cities he knew of, which he feared would encounter the same fate ere they would be aroused to a sense of self-preservation. Memphis had been sick unto death. One sixth of the population in two summers were dead and buried ; and those who survived were impoverished. He asked if this was a time to hold them up to public censure. And he inquired if there was a people in the world who would not have acted as the Memphis people have acted in making it their first business to nurse the sick and bury the dead. The long roll of the names of the Memphis dead, stricken by this fatal pestilence, said in unmistakable language to this Association, " Here is a foeman worthy of your steel." The interests of humanity and commerce demand that Memphis shall be redeemed. Its true condition, he thought, could not possibly be exaggerated : the ordinary means of cleansing and disinfection were no cleansing and disinfection at all. But he earnestly appealed to the Association to make the cause of Memphis its own cause, and the redemption of Memphis its individual and united work.

Dr. A. B. Waterfield, of McKenzie, said he agreed fully with Dr. Campbell. In no instance, out of 2,000 cases in Memphis, did any one contract the disease from personal contact with the sick, but in every instance the infection was carried in things — baggage, personal effects, or freights. In regard to whether cotton is a material peculiarly fitted to convey infection, he was not fully satisfied ; but if yellow fever was introduced into Covington, Tenn., as it unquestionably was, surely a material as porous as cotton was even more likely to carry infection.

To illustrate, he specified the following cases which occurred in Covington under his immediate observation : —

A German Jew sickened and died in a room in which nine persons ate and slept, yet no one else took the disease.

A negro from Memphis was taken with the fever in a crowded room amid filthy surroundings, yet no one else of the number who occupied the room with him had the fever. A lady from Memphis opened her trunk of clothing, and five days after took the fever. Her two children lived and slept with her, yet were not attacked. The postmaster received at one time about ten bushels of delayed mail matter from Memphis, and attempted to disinfect it himself. Soon after he was taken with the fever and died, but no one of those most intimately associated with him had the disease. These instances he regards as conclusive as to the question of personal contagion.

Dr. Elisha Harris, of New York, said that the public generally would accept any clearly enunciated plan which is urged by the medical profession. The latter differed as to their ideas, but they had a common thought — to prevent disease. He thought they should make concessions on points they did not fully agree on, and agree on those ideas which they will accept as the proper plan to be pursued. Before leaving New York, a member of the New York Chamber of Commerce requested him to present to the American Public Health Association a code of international rules for the quarantine of such diseases as cholera, yellow fever, typhus fever, scarlet fever, etc. The medical profession were agreed that yellow fever did not originate in Memphis *de novo* in the first epidemic, and that it had appeared and disappeared and appeared again in New Orleans. Dr. Harris then presented the following: —

PROPOSITIONS RELATING TO INTERNATIONAL RULES OF QUARANTINE.

[NOTE BY ELISHA HARRIS, A. M. M. D., OF NEW YORK.]

The President of the Association happily noticed the propositions that were submitted to the *International Conference for Reform of the Law of Nations*, which met at London last summer. These propositions, as submitted by Sir Sherston Baker, and referred to by Dr. Cabell, indicate the near readiness of civilized countries to devise and agree upon a rational basis of sanitary rules for the public care and international protection of the health of all countries so far as commercial relations and mutual agreements can affect this desirable result.

The Conference to which Baronet Baker presented the propositions, though purely a voluntary convention of eminent publicists who concern themselves in the progress of civilization as influenced by the laws of nations, was the fourth one of its kind, and to its councils it had invited the Chamber of Commerce of New York to send a representative, to take part in the deliberations. That distinguished representative of our Chamber of Commerce, Hon. Samuel B. Ruggles, of New York, has requested me to present the subject and a copy of Sir Sherston Baker's paper to the American Public Health Association; and he requests me to state that upon reflecting on the subject, and seeing the importance of at once protecting, while freeing commerce from all needless embarrassments, he has deemed it a duty to submit copies of this paper to the Chamber, and to us as the proper advocates of the desired sanitary reforms. Mr. Ruggles particularly requests that there shall be a careful scrutiny of the paper and the merits of the scheme thus submitted, especially as the whole subject will be again brought before the Conference at its fifth meeting in the early part of the summer of 1880.

The learned author of the paper submitted to the Conference has rightly judged that the best interests of commerce and of nations would be promoted by ascertaining and agreeing upon that "minimum of precaution which, if honestly observed, shall save a country or part of a country from being placed in quarantine by other states, so long, of course, as the country itself be free from disease." He assumes that there are infectious plagues which will, for the present, have to be repressed along the highways of international travel and commerce, and that the natural tendency of the sanitary restrictions which any port or people establishes for its own protection is to an excessive and perfunctory kind of precaution which to others must appear to be, as it generally is, capricious and harmful. By the suggestions here submitted, there is a reasonable method prevised for a basis of inter-state and international agreement upon all those conditions which are necessary and dutiful for the complete and well-defined means of giving assured protection against the deportation and spread of any infectious and contagious causes of disease. The consensus of facts in the ætiological and sanitary history and experience of the several maladies that have proved their aptitude to spread in a pestilential way, by human intercourse, from place to place, is recognized as the very first necessity in the proposed basis of international agreements concerning a cosmopolitan code of external sanitary police regulations.

The several international convocations, beginning with that which met at Paris in 1851, have dealt with the details of sanitary procedures which pertain essentially to successful local administration; but the deliberations of the Vienna Conference, in 1874, prepared the way for generalizing an international basis of national sanitary police, for the most emphatic conclusions of that body reasserted the duty of sanitary inspection, cleanliness, and, generally, of vigilance in the local sanitary administration; while all restrictions in the nature of quarantine must be simplified and made to apply in the most definite and legitimate manner to the necessities of the different lines of exposure, and as the verdicts of sanitary science and an international sanitary commission. In other words, the duty and responsibility of a faithful maintenance of the local defenses against disease, was relegated to municipalities and states, while the plan and procedure of general defense against the approaches and initial propagation of portable infection or contagia is acknowledged to need such international agreements as shall exclude and stamp out all infective virus as far as possible, and with greatest faithfulness obtain and impart information for aiding in the detection and subjugation of every vagrant pestilence. Differences in the natural history of these maladies, diversity in the behavior and limitations of their infective attributes, respectively, and the changing conditions of commerce and the climates, leave to the states and nations concerned in quarantine protection, and even to the different ports and parts of states, the necessity of providing against the local and some other conditions which are accessory to the propagation of infectious pestilences. To determine what measures and by what methods the several states and nations may unite in accepting as the best line of defense adapted to the necessities of civilization in regard to these pestilences, and an effectual warfare against them, is the object of Sir Sherston Baker's proposed international consensus and rules of quarantine.

What those rules shall be, and with what flexibility the code should be applied, can be determined only after a sufficient number of states and nations shall have agreed to abide the agreement to adopt a suitable code. Fortunately, the one peculiar experience and its causes which in all the international conferences hitherto has barred the way to the desired agreement upon international rules of quarantine is now well understood. This is shown by Baronet Baker's remark, that "the stumbling-block to all these conferences was the anxious endeavor of their representatives to reduce the conflicting quarantine systems of the world to uniformity, not only of theory and practice. but of practice even in its utmost details." It was so plainly seen in the Vienna Conference that ports and countries which are most exposed to the direct importation and invasion of cholera by well-known lines of commercial intercourse like the Red Sea, or the Caspian and Black Seas, ask for rigorous quarantine protection; while the ports and countries of Northern and Western Europe seem almost to prefer to be wholly emancipated from quarantine regulations ; yet no European country, and probably no American State, is prepared to dispense with the right to enforce certain quarantine restrictions when the protection of particular ports and districts shall need such protection. Even if it shall be found quite needless, in some well governed regions, ever again to quarantine against cholera, it still would be necessary, under certain circumstances, to quarantine yellow fever whenever its infective poison arrived by land or water, as it did reach the far north port of Swansea in South Wales, in 1865, by a vessel, the *Hecla*, laden with copper ore, and killed fiften inhabitants during the month of September ; and as it also did at St. Nazaire, on the Loire, in France, in August, 1861, killing twenty-six persons before suitable quarantine restrictions were organized. In short, the exigencies that demand the operation of quarantine restrictions so vary, and the degrees of rigorous enforcement of particular rules as well as the time of insulation so vary and differ for different climates and seasons, that rules of quarantine, if for international observance, must be flexible enough to conform to such circumstances ; in other words, they must in themselves be adapted to insure the sanitary protection which is possible for a country by general observance, while inciting the best local police activities against a common enemy.

Yellow fever virus was conveyed to Southampton and thence to London, and destroyed some lives, the past autumn, but no further harm occurred. Had Lisbon or Savannah been thus exposed at the same dates, the disease would have spread, and this is a sufficient illustration of the general principle which Sir Sherston Baker recognizes, — these diverse degrees of peril, and of the local as well as general necessity for sanitary procedures in the nature of quarantine. He would have the "foul bill of health," or even the occurrence of a case of infectious disease at any time subsequent to date of such bill, treated with a strict regard to the proposed International Quarantine Rules ; and in addition to this, after the scale of restrictions agreed upon by the high contracting countries has been complied with, as respects the sliding conditions of maximum and minimum periods, etc., it shall "be optional for any state to adopt any period within those limits. *Every state to preserve its own municipal quarantine system*, except on such points as may nullify or contradict these [international] articles."

Here we find a practicable solution of the chief difficulties of the vexed and long unsettled problem of inter-state and international Rules of Quarantine. The National Board of Health and the statute that created it have incorporated this cardinal principle of coördination of the National with the State and municipal sanitary authorities, and of relegating to the local authorities all control over the details and enlargement of sanitary procedures which they shall deem necessary for local protection, though the general safety of the States, and the rest of the world. has been secured by the observance of the rules prescribed by the National Board. This view of our American experience in a republic of States, where each State and municipality enacts and applies its own public health laws and regulations, certifies beforehand the probable feasibility of international rules for the protection of the public health of all countries; and it may properly be suggested to the author of the paper we are now considering, that in addition to the international agreement respecting Rules of Quarantine as proposed by him, there is also a common ground upon which the nations should, as soon as practicable, establish international sanitary regulations, by which the ships and great thoroughfares, the migrants, travelers, ports, and food products of all civilized countries shall be under the sanitary protection of laws that regard the welfare of all nationalities.

It is plainly the destiny of the proposed "Quarantine Centres," and of certain stations of refuge,.to facilitate the prompt and complete isolation of the real sources of pestilential contagia; and to accomplish this result, with the least interference with travel and commerce, is the most important desideratum in all these matters of external sanitary police. Commerce and the necessities of our civilization present these comprehensive problems of state medicine and international comity. Sir William Pym, M. de S. Dupeyron, and M. Melier, as the chief official advisers in matters of quarantine for England and France, failed to offer a basis for practicable agreement of all commercial nations; but now the counsels of the most eminent etiologists and medical statesmen like Simon, Drs. Hirsch, Buchanan and Radcliffe, Pettenkofer, Fauvel, Bartoletti, Seaton, Polak, and others on the Eastern continent; and the several true state hygienists of the Western continent, whose names and services are familiar to us, have prepared the way for a national and international treatment of the pestilential enemies which wander and ravage wherever there is neglect of sanitary precaution. That treatment upon which nations must agree is by "jugulation" of the infective causes, and by a dutiful surveillance and system of public information; yet, as Baronet Baker has wisely appreciated, the efficiency and vigilance of local and state sanitary authorities, acting coördinately in the general plan of public health care and of full responsibility, is the most essential thing, and it must be insured in the proposed international agreements. Because of this rational view of the necessary kinds of help that the sanitary police system of nations should give to the public health and the commerce of the world, we can thankfully welcome this well considered paper of the learned publicist who seeks to ameliorate and harmonize the laws of nations in regard to quarantine. In the earnest hope of contributing to this result, his colleague, who represented the Chamber of Commerce at the International Law Conference, requests us to examine these propositions critically. Commerce accepts any just verdict that most effectually protects its own great highways and the public health of ports and countries. In regard to the diverse and capricious systems and laws of quarantines in the past times, it is so true that, as Mr. Simon once said, "Practically speaking, where great commercial countries are concerned, it can scarcely be dreamed that quarantine restrictions will be anything better than elaborate illustrations of leakiness."

To overcome the evils of independent and capricious laws and procedures of quarantine, without impairing the authority which must, on certain occasions and in certain places, be exercised for the arrest and stamping out of pestilent contagia that escape the boundaries of their *endemicite*, and which must by local officials be exercised so promptly as to prevent the formation of any secondary foci of infection, is now the problem before us. In the general war upon a common foe, the states and ports which mobilize their entire local sanitary forces will find less and less use of picket guards and of quarantine patrols. To whatever extent such external sanitary police is necessary, let there be good understanding and agreements along the whole line of defense.

INTERNATIONAL RULES OF QUARANTINE.

[BY SIR SHERSTON BAKER, BART.]

THE constantly increasing maritime commerce between different nations calls imperatively for a uniformity of the laws by which the practice of quarantine should be governed. The more the laws of respective countries diverge, the more difficult it becomes to lay down rules and regulations which are capable of being made to coincide with the ideal conceived to be necessary for the one end in view, viz.: the prevention of the introduction of disease.

In some countries, such as Holland, quarantine exists rather in theory than in practice; in others, such as Austria, quarantine measures are severe and rigorously carried out. In France "the General Regulations of the Maritime Sanitary Police" of 1876, have reviewed — perhaps modified — the then existing law of 1853. In England the Statute 6 George IV., c. 78, which was passed in 1825, and which, it should be observed, is limited in its operation to the United Kingdom, repealed several earlier laws, and enacted other and less stringent provisions in lieu thereof; it is not, however, called into requirement in England, except in cases of plague, yellow fever, and cholera, owing to the ample manner in which the sanitary work is carried out, under milder regulations, by the officers of the "Port Sanitary Authority." This authority is constituted by the Local Government Board. by virtue of the "Public Health Act of 1875," and is now in operation at all the chief ports of England. Other countries have, within the last ten or fifteen years, modified the severity of their laws; but the benefit of these relaxations in favor of shipping and of commerce can only be very partial, so long as other countries do not take part in them, or continue to act each according to its own idea, and to follow different rules of quarantine, especially with respect to vessels which may come from the eastern ports of the Mediterranean. It should not be forgotten that the interest of every port situated on the same sea is, to a certain degree, identical, for each port has numerous matters more or less in common with its neighbor.

If one state abolishes or relaxes its measures of quarantine, and a neighboring state preserves a vigorous procedure, it is evident that the advantages which may result to commerce from the reforms of the one will be materially depreciated, or even more than counterbalanced, by the severity of the quarantine which the other state will exercise towards the vessels arriving from the ports of the former. It is, therefore, the interest of all — especially of neighboring — states that their measures of prevention should be uniform.

It has often been strongly, and I may say, passionately affirmed, that measures of quarantine are unavailing. But this opinion is opposed to the general *consensus* of all the civilized states, and is contrary to the testimony of the highest medical authorities, among whom I will instance the opinions of the Royal College of Physicians in 1818,[1] of Dr. Giovanni Cabiadis,[2] of Mr. Simon, the medical officer of the Privy Council,[3] and of Dr. Seaton,[4] Medical Officer to the

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[1] We are of opinion, although some epidemic diseases are not propagated by contagion, that it is by no means proved that the plague is not contagious, or that the regulations of plague police are useless or pernicious. We are persuaded, on the contrary, from the considerations of the experience of all ages, and some of us from personal observation, that the disease is communicable from one individual to another. . . . . The doctrine of contagion appears to us to be wholly unshaken by any argument which Dr. Maclean [referring to the then recent work of Dr. Maclean, entitled "Results of an Investigation respecting Epidemic and Pestilential Diseases, including Researches in the Levant concerning the Plague"] has adduced; at the same time we think it probable that some of the personal restrictions enforced in the establishments for quarantine might be modified without risk to the public health.

[2] Dr. Giovanni Cabiadis, as the result of his observations during the outbreaks of the plague in 1876–77, does not attempt to deny the contagious properties of plague, but he does not accept unconditionally the assertion of those who pretend that you must keep at a distance, say of six meters, from the patient, in order to avoid contracting the disease. The experience acquired by him during the epidemic outbreaks of Hillah and Bagdad have convinced him that no great risk is incurred, *in touching persons affected with the plague*, provided you avoid exposing yourself for any lengthened period to the atmosphere of the apartment occupied by them. While the Mohammedans, discarding all sanitary precautions, live with and handle plague patients, the Jews and Christians, on the contrary, firmly believing in its contagious properties, very seldom *touch them*; yet all of them equally catch the disease, *if they live in the same house* with the plague patient, but are safe if they *quit the house* the moment a case of plague occurs in it. Dr. Cabiadis says that he considers the *atmosphere* which surrounds a person affected with plague as *the true medium of transmission*. Apart from this he has also met numerous instances in which he believes the *clothes and bedding of plague patients* communicated the malady to sound persons living beyond the sphere of the epidemic outbreak. Such articles were made of wool, cotton, flax, or hemp.

[3] Mr. Simon, in his Eighth Annual Report, says: "The precautions generally which may be taken against contagious diseases, are of two kinds: *First*, If possible to prevent the entrance of the contagion; *Secondly*. If the contagion be present, to annihilate, as far as possible, the circumstances which favor its spread. And thus as regards cholera, a first and incalculably important question to be answered by those who have to care for the public health of a country is the question, whether by any measures of quarantine they can provide that all contagion of the diseases shall be kept outside the limits of their land. Subject to one qualification, which is not an important one for the present argument, it may, I think, be accepted as certain, that quarantine conducted with extreme rigor, and with the precision of a chemical experiment, will keep cholera out of any part of Europe, in which the extremely difficult conditions can be absolutely fulfilled, and thus speaking as to the dry question of medical practice, I have no hesitation in saying that England ought to resist cholera by quarantine." And in a postscript to minutes respecting merchandise arriving in England from countries affected with the plague, July 3, 1875, he says: "With reference generally to the importability of morbid infections from the Levant by means of the materials of commerce, I would observe that the branch of trade which ought to be regarded as most open to the suspicion of danger (if danger is to be suspected of any branch whatsoever) is, I think, the *rag trade*. In regard of many infectious diseases, it is well known that certain sorts of things used by the sick, such as their clothing, bedding, towels, handkerchiefs, napkins, etc., get imbued with infective matters, are thus rendered for a longer or shorter time capable of conveying infection."

[4] Dr. Seaton in his Seventh Annual Report, (1877), says: "A theoretically perfect quarantine, a quarantine which it should be impossible to break on any point, and which must, of course, include the full period of incubation of the particular disease quarantined against, *would doubtless*, if practicable, *afford a certain higher degree of security*

Local Government Board, who, although divergent, tend to support the ideal of a prophylactic quarantine.

On the other hand it is right that I should recall to recollection that such opinions have been vehemently controverted by well-known writers, as Dr. Maclean and Dr. Bowring; also Mr. Netten Radcliffe appears to incline to their views.

I, therefore, propose to the Conference to consider whether the rules of prevention may be made so uniform that they may be of international adoption. So far back as 1838, the French government proposed the formation of a congress of delegates from the different European states having ports in the Mediterranean, to adopt some international rules of quarantine. Lord Palmerston (then Foreign Secretary) acceded to the proposal; but, in consequence of some difficulties suggested by the Austrian government, the scheme was abandoned.

In 1843 the Earl of Aberdeen (then Foreign Secretary) again attempted to bring about a meeting of delegates, but the delays of the Austrian government again defeated the project. At length, in 1851, on the invitation of the French government, an International Sanitary Conference met at Paris, with the object of establishing a uniform system of quarantine. France, Great Britain, Austria, Russia, Sardinia, Tuscany, the Papal States, Naples, Turkey, Greece, Spain, and Portugal, being the twelve States which had territory, or had important interests on the Mediterranean, were represented. Dr. Melier, as French delegate, took the chief part in the discussion. Through his conciliatory spirit, and mastery of the whole of the intricate question involved, a provisional understanding was arrived at on all the points that were raised. A draft convention, with "International Sanitary Regulations," was adopted. Not only were restrictive measures reduced to a minimum for the plague, yellow fever, and cholera, but they were precisely defined, in lieu of those which had theretofore been in practice. Sanitary precautions also were fully considered; and the much desired uniformity was even extended to the detail of administrative organization.

Unfortunately, when this important work was submitted to the various powers, France, Sardinia, Portugal, Tuscany, and Turkey, alone ratified it, and adopted the system; the other powers being influenced by motives which, so far as I am aware, have not transpired.

The end for which the Conference was assembled was therefore only partially attained. In its endeavors to promote uniformity, it would seem to have gone too far. Not content with recommending uniform measures of prevention, which alone was a matter difficult to attain, it had endeavored to supplement these measures with a code of procedure which was to be universal, varying thereby the municipal laws of the several states which were parties to the Conference. This was too great an attempt, and one which was sure to encounter insurmountable obstacles. This, therefore, was the rock on which the convention split, and the result was that the five states which had ratified the convention hastened to renounce it so soon as the term of five years provided for by the convention had expired.

In 1859 the French government returned to the subject, and invited a Conference to meet at Paris. It was hoped that by eliminating from the subject for discussion certain questions which refined its purpose too much, especially such as related to the procedure for carrying out the quarantine measures, the delegates might succeed in attaining to an understanding on the general principles. A draft convention was, with this object, prepared, but it was not found possible to reconcile all the conflicting interests involved, and the Conference ceased to exist.

against the introduction of disease than can be obtained by mere inspection on arrival as to the actual existence of diseases."

The appearance of cholera in Europe in 1865 was attributed to the return of the Mohammedan pilgrims from Mecca. This infection spread along each of the several lines of steamboat communication, which diverge from Alexandria as a centre, to all the most considerable ports of the Levant and of Southern Europe. This gave rise to a third Conference, also at the suggestion of France. The meeting was held at Constantinople in the following year (1866). All the States of Europe, as well as Egypt and Persia, were represented. The etiology and the prophylaxis of cholera were the subjects of the discussion. It was hoped by the Conference that some understanding might be arrived at as to the measures proper to be taken for the prevention of a fresh importation of that dire disease. The work of the Conference, both scientific and practical, was considerable. It certainly threw much light on the etiology of cholera. Its prophylaxis was considered by the Conference from every aspect, both with regard to India, whose valley of the Ganges is the source of the scourge, as also the various methods or channels by which the disease is imported into the various states of Europe. But, like all its predecessors, this Conference was doomed to be unproductive of any material or lasting results. Nevertheless, it bore this fruit, that legitimate hopes were raised that the recommendations which it had sanctioned concerning measures of prevention in the Levant would be generally adopted and followed. The work of the Conference of Constantinople also left its influence on the practice then in force in Europe for the prevention of cholera. All the southern states saw the necessity of modifying their sanitary regulations, which now show marked traces of the beneficial influence of the Constantinople Conference.

But the Conference of Constantinople was not the last attempt to arrive at uniform measures of prevention against the cholera. In 1874 the Austro-Hungarian government took the initiative in convoking, at Vienna, another Conference for this purpose, as well as for establishing a permanent International Commission, to be intrusted with the duty of studying all questions relating to the etiology and to the prophylaxis of cholera. This Conference was composed almost entirely of members of the medical profession; it was unanimous on the fundamental scientific questions, and its conclusions were confirmatory of those of the Conference of Constantinople. The transmissibility and the propagation of cholera by importation were not denied, but there was much difference of opinion concerning the measures of prevention, which it would seem ought, if perfect, to have been the corollary to the scientific doctrine which was admitted on all hands. Some delegates advocated the abolition of quarantine, and to replace it by a mere medical inspection, followed, where necessary, by disinfection; while others, on the contrary, argued in favor of it. Nevertheless, all were agreed as to the consequences of the importation of the disease. This divergence of opinion as to quarantine resulted from the fact that some delegates represented states where it was alleged cholera is nearly always permanent, or else which, through their proximity to such states, from the force of habit, or from disbelief in quarantine, disregarded any means of protecting themselves. Others preferred the certain advantages which result to commerce from not being trammeled with vexatious quarantine regulations, electing the certain commercial gain to the doubtful risk of propagation.

Again, other delegates, who represented states in the South of Europe, considered that the interest of their countries was best served by being guaranteed against the importation of cholera. Both parties brought plausible arguments to bear in support of their views. The result was that the Conference recognized the fact that there was rather a possibility of concord between certain states to the North of Europe, and between states to the South of Europe, than a universal national agreement.

Nevertheless, it should not be forgotten by us that the stumbling-block to all these Conferences was the anxious endeavor of their representatives to reduce the conflicting quarantine systems of the world to uniformity, not only of theory and practice, but of practice even in its utmost details. Therefore, I prefer instead to consider the minimum of precaution, which, if honestly observed, shall save a country, or part of a country, from being placed in quarantine by other states ; so long, of course, as the country itself be free from disease.

I have endeavored to reduce this scheme to writing, and for the convenience of the Conference have drafted it in the form of Articles (forty in number), which I beg to submit to the consideration of the Conference. The following is a brief outline of my suggestions. They refer to the plague, yellow fever, and cholera only : An " International Bill of Health " to be granted by the local authority of the port of departure to every vessel, and to be delivered up by the vessel at the ultimate port of destination. This bill to be *viséd* at the port of departure by the consul representing the port of destination, in such terms as he shall think fit. A similar *visé* to be required at every port touched at, both from the local authority and from the consul representing the port of destination. This bill of health to be accepted in all ports of the High Contracting Parties. A foul bill of health or a case of disease, past or present, on board, or the fact of any port having become infected within a limited time after the departure of a vessel from it, to authorize the local authority of the port of arrival to place the arriving or touching vessel in quarantine, according to a certain scale, containing a maximum and a minimum period of quarantine; it being optional to every state to adopt any period within those limits. Every state to preserve its own municipal quarantine system, except on such points as may nullify or contradict these Articles. Measures of disinfection for passengers, crew, and cargo, to be required, but in every case to be left to the municipal regulations to supply the details. Lazarets and hospital ships to be provided in sufficient number, and to be regulated according to the best sanitary principles, but again the details to be left to the municipal authority.

To avoid the necessity of placing a whole state in quarantine, especially where a state comprises distant colonial possessions, each country to be divided by its own government into territorial divisions, to be termed quarantine " centres." Each state to engage to guard rigidly against any infected " centre," and to place the same in quarantine.

PROPOSED INTERNATIONAL RULES.

ARTICLE 1. The high contracting parties agree to apply to the plague, yellow fever, and cholera the sanitary measures hereinafter mentioned. In these articles the word " disease " shall comprise the plague, yellow fever, and cholera ; the word " infected " shall mean " infected by the plague, yellow fever, or cholera ; " the word " centre " shall signify any of the territorial divisions in the schedule to these articles set out ; the word " consul " shall include " any representative delegated by a consul ; " the words " bill of health " shall mean the " international bill of health ; " and the word " hospital " shall mean a lazaret or hospital-ship.

ART. 2. At the port of departure, or at any port touched at, every vessel, both before and after she is loaded, may be inspected by the local authority of the port, and by the consul of the " centre " of the port of destination, and she shall be subjected to such reasonable sanitary measures as the local authority may deem necessary. These measures, when necessary, shall be effected at the expense of the local authority, and as quickly as possible, so as to avoid every delay to a vessel.

ART. 3. At the port of departure the passengers and the crew may be examined by a medical officer, at the request either of the local authority or of the consul of the "centre" of the port of destination. The departure of any person who may be affected by any "disease" may be forcibly prevented by the local authority with or without the request of the consul of the "centre" of the port of destination. Such examination shall be made as quickly as possible, so as to avoid every delay to a vessel.

ART. 4. There shall only be two bills of health, namely, a clean bill and a foul bill: the first shall state the absence of "diseases" in the "centre" from which it is issued; the second shall state by name the presence of one or more "diseases" in the "centre" from which it is issued. Every bill shall also state the following particulars: The name of the vessel to which it is issued, the name of the captain or master, the tonnage, the cargo, the number and sanitary condition of the crew and passengers, and the sanitary condition of the vessel and the ports it is proposed to touch at.

ART. 5. Every bill of health shall be drawn up and signed by the local authority of the port of primary departure in the name of the territorial government; and it shall bear the *visé* of the consul of the "centre" of the port of destination, and shall be credited in all the ports of the high contracting parties, subject to the subsequent local and consular *visés*. The consul of the "centre" of the port of destination may affix a qualified or negative *visé* should he think fit; but in such case he shall state the nature of the qualification or his reason for negativing the signature of the local authority. It shall be optional to other local authorities to admit a vessel with such a qualified or negatived bill of health to pratique, or to require her to undergo a quarantine within the limits set forth in article 20.

ART. 6. The local authority of every port where a vessel may touch shall require the production of the bill of health of the vessel, and the same authority and the consul of the "centre" of the port of destination shall affix their respective *visés* to the said bill of health. Such *visés* may be *confirmatory*, *qualified*, or *negative*, according as the authority or consul may respectively deem expedient; but in the two latter alternatives a reason shall be assigned on the bill of health.

ART. 7. Every vessel shall have one bill of health, and no more.

ART. 8. This bill of health shall be in the following form, and to the following tenor and effect: —

INTERNATIONAL BILL OF HEALTH.

To all to whom these presents shall come, the undersigned, health officers of (name of State), at the port of (name), sendeth greeting: —

I hereby certify that the vessel called the (A.), whose master (or commander) is (B. C.), is about to sail from this port for (X.), in the "centre" of (W.), on , the day of , 18 , *and proposes to touch at* (D.) *and at* (E.) *on her voyage*, under the following conditions: —

Tonnage: . Nationality: . Cargo: . Number of crew: . Sanitary condition: . Number of passengers: . Sanitary condition: . Sanitary condition of vessel: .

I further certify that in this port and neighborhood there is (not) a case of the plague, yellow fever, cholera.

Dated this day of , 18 .

G. H. [L. S.]
Health Officer.

I indorse [or qualify] the above, [and say that, etc.]

T. J.,
Consul for W.

NOTE. — In the case of a vessel of war erase the words in italics.

ART. 9. Under normal conditions, when a "centre" is not known to be "infected," the following vessels may be unprovided with bills of health: —

1. Fishing vessels.
2. Pilot-boats.
3. Revenue-cutters and guard-vessels.
4. Coasting-vessels running between different ports of the same country.

ART. 10. Under normal conditions, by a declaration to be exchanged between two of the high contracting parties, certain vessels from ports of certain "centres" of the one country, going to ports of certain "centres" of the other country, may be exempted from the obligation of carrying a bill of health.

ART. 11. No bill of health is to be kept back by any local authority or consul under any pretense whatsoever, except by the local authority of the ultimate port of destination, who shall receive and keep the bill of health.

ART. 12. A bill of health shall only be valid if it shall have been given or *viséd* within the forty-eight hours preceding the departure of the vessel, except when the vessel may be detained by stress of weather, provided that in such case she has not communicated with the shore since the date of her bill of health.

ART. 13. Every vessel from any port which has become "infected" within [seven] days after the departure of the said vessel, shall, notwithstanding a clean bill, be considered to be furnished with a foul bill of health.

ART. 14. A bill of health shall be considered clean although "disease" may exist in the "hospital" of the port of departure or of any port touched at.

ART. 15. Every vessel provided with a clean bill of health, which shall not have had while at sea any case of disease or suspicious communication, and which shall present herself in a satisfactory sanitary condition, shall, subject to Article 13, immediately be admitted to pratique in every port of the high contracting parties.

ART. 16. Whenever a vessel is admitted to pratique, her cargo, passengers, and crew (except such as may be "infected") are exempt from all sanitary measures.

ART. 17. Every healthy port may protect itself against any "infected" vessel, persons, or goods, by placing the same in quarantine, and (subject to Article 20) by subjecting the same to such sanitary measures as circumstances may render necessary.

ART. 18. The right is reserved to all the high contracting parties to enforce the particular quarantine system of each state, and to make their own municipal rules for carrying out the details of these articles; provided always that no such particular quarantine system or municipal rules shall contradict or render nugatory the present articles.

ART. 19. Whatever the number of sick on board, and whatever the disease or other illness, a vessel shall never be sent away from a port without assistance and due regard being paid to the rights of humanity. But if a port be without a "hospital," the local authority may send the vessel to a neighboring port, or cause the vessel to remain at anchor in an isolated spot under the watch of the local authority.

ART. 20. For the more easy application of quarantine, the high contracting parties agree to the principle of a maximum and a minimum quarantine. Every "centre" may adopt either the maximum or the minimum quarantine at pleasure, according to the following scale, which governs all vessels, persons, and goods, except such persons as shall be found on arrival at a port to be suffering from "disease": —

Arrival with Bill of Health.	Disease.	State of Disease.	The Plague.		Yellow Fever.		Cholera.	
			Maximum Quarantine.	Minimum Quarantine.	Maximum Quarantine.	Minimum Quarantine.	Maximum Quarantine.	Minimum Quarantine.
Foul........................	No case ..	....	5 days..	3 days..	7 days [1].	5 days [1].	3 days..	1 day...
	Case	Recovered..	10 days.	5 days..	10 days [2]	7 days [3].	7 days [2].	7 days [2].
	Case	Dead.......	10 days.	5 days..	10 days [2]	7 days [2].	7 days [3].	7 days [3].
	Case	Subsisting..	15 days.	10 days.	15 days.	10 days.	7 days..	7 days..
Clean........................	No case..	....	....	....	....	....	....	....
	Case.....	Recovered..	10 days.	5 days..	10 days [2]	7 days [2].	7 days [3].	7 days [3].
	Case	Dead.......	10 days.	5 days..	10 days [2]	7 days [2].	7 days [2].	7 days [2].
	Case	Subsisting..	15 days.	10 days.	15 days.	10 days.	7 days..	7 days..

[1] If the vessel has been at sea for 14 days a medical inspection of the passengers and crew shall be substituted for this period.

[2] If the recovery or death occurred 14 days before arrival this period shall be reduced to 5 days.

[3] If the recovery or death occurred 14 days before arrival this period shall be reduced to 4 days.

ART. 21. Every person found to be suffering from "disease" shall, on arrival at a port, be removed to a hospital, and shall be detained there until recovered.

ART. 22. Every captain or master shall record on the log an exact entry of every communication made at sea in order to detail it on arrival, if requested to do so by the local authority.

ART. 23. Every vessel on arrival shall be subject to any inquiry as to her port of departure and destination, and to such interrogations as the local authority may see fit. She shall also produce her bill of health without demand. A ship of war shall only be required to produce her bill of health, but the word of her commander shall be required to guarantee her good sanitary condition.

ART. 24. Should a local authority deem it necessary on the grounds of health, and for a reason to be by them given in writing to the master of any vessel (whatever the bill of health of the same may be), they may cause an inspection to be made of the said vessel before admitting the same to pratique. Should the state of the cargo, or the crowded or infectious condition of such vessel, or any similar cause, determine the local authority to detain such vessel for the purpose of considering whether she should be dealt with under the following Article 25, they are authorized to so detain her for a period not exceeding twenty-four hours.

ART. 25. The bad sanitary condition of any vessel, whether in quarantine or not, shall authorize the local authority to subject the same to such sanitary measures as a vessel with a foul bill of health may be subjected to. If the vessel shall not be placed in quarantine, the sanitary measures shall be carried out by the master at his own expense under the direction of the local authority.

ART. 26. The cause for which a vessel is placed in quarantine shall in each case be assigned in writing, and delivered to the master or commander without any delay.

ART. 27. Quarantine shall entail such special measures of purification and disinfection, both with regard to vessels, passengers, crew, and cargo, as the local authority may deem necessary. Anything destroyed by fire by the local authority shall be paid for by them.

ART. 28. The right is reserved to all consuls to be present at the opening and purifying of letters and dispatches which may arrive by vessels and which are addressed to them or to their countrymen. The same right is reserved to the post-office.

ART. 29. Whenever during a quarantine a case of "disease" shall appear, the quarantine must commence afresh from the date of the death, recovery, or removal from the vessel of the last case of disease.

ART. 30. Quarantine may be performed at an intermediate port between the port of departure and that of destination. On proof being given in writing of such quarantine and of its sufficiency, and attested not only by the local authority of the intermediate port, but also by the consul of the "centre" of the port of destination, such vessel shall be admitted to pratique.

ART. 31. Each of the high contracting parties engages itself to maintain or to furnish for the reception of ships, passengers, crews, and goods subject to quarantine a sufficient number of "hospitals" for the convenience of travelers and the requirements of commerce.

ART. 32. The interior arrangements of a hospital shall be made on the best sanitary principles, and shall be such that the persons and articles in quarantine from different dates may be easily kept apart. There shall be spacious and convenient reception-rooms to enable persons from without to visit those in quarantine without prejudice to the precautions necessary to protect public health. Gratings shall be abolished, as also everything which might have a prejudicial influence on the moral well-being of those in quarantine.

ART. 33. Every hospital must be supplied with good water, and in sufficient quantity. A tariff, fixed by the local authority and publicly exhibited, shall, with the concurrence of the respective consuls of the port, be revised every [six] months. In this tariff the price of food shall be stated on the lowest scale, and such food shall be supplied at convenient hours to the persons in quarantine at their own expense.

ART. 34. A medical officer of the local authority shall, whenever his services are likely to be required, be attached to the hospital, to visit those in quarantine and to assist in the execution of sanitary measures. His attendance shall be free of charge. The sick and others detained in hospitals shall be entitled to such religious ministration and medical comforts as they may require, but the persons employed in administering the same must themselves undergo quarantine. Their services will be paid for by the sick whom they may attend.

ART. 35. The local authority shall, in every case, destroy by fire all wearing apparel or bedding recently used by the dead, or those stricken with any "disease." Other infected articles shall be subjected to the most thorough process of purification.

ART. 36. All letters and dispatches shall be forwarded to persons in hospital without delay. Letters and dispatches from persons in hospital shall be purified in such manner as the local authority may direct, provided that the writing be not obliterated, and shall be forwarded without delay.

ART. 37. The high contracting parties agree not to impose directly or indirectly on the shipping, passengers, crew, or goods of the respective states other quarantine charges than the dues and charges specified in these articles.

ART. 38. The high contracting parties engage themselves to guard rigidly against any "infected centre," and to place the same in quarantine.

ART. 39. Articles, 2, 3, 9, 21, 24, 25, and 27, respectively, shall not apply to the vessels of war of the high contracting parties.

ART. 40. The present regulations shall be in force and vigor for [five] years. If [six] months before the expiration of that term none of the high contracting parties shall have, by an official declaration, announced an intention of withdraw-ing from them, the regulations shall remain in force during another [year]; and so on from [year to year] until repealed.

[It is obvious that the "centres" cannot be defined until it is known what states may think fit to become parties to these rules.]

Dr. HARGIS said: —

MR. PRESIDENT, — I am strongly inclined to make an issue with Professor Campbell on some points which his very able paper contains; but decline for the present, because, on reflection, while I freely admit that discussion may prompt a thought, or suggest a train of associated ideas that might ultimately lead to important consequences, at present it can scarcely result in anything of practical utility, at least in a sanitary point of view. I am, however, constrained to say that I concur fully with Dr. Campbell in the sentiment that "filth, on land, will not produce yellow fever even if filled up to the second story windows, unless the seeds are there, and the germs are either imported shortly before fever appears, or a year or more before." It is said by high authority that disease germs, or any morbific principle, may lie dormant for several years, then wake up, as it were, and become a prolific source of disease. This I know to be true from my own personal observation and experience.

I propose, now, to resume the subject of my remarks of yesterday, by recapitulating in brief what I intended to say before the gavel warned me that my "time was up." I affirmed that the yellow fever is the ship fever of the tropics, communicable and portable; that it was undoubtedly a creature of the sea originally, and does now sometimes, nay often, originate *suâ sponte* on ships that have never touched at any place where yellow fever prevailed or existed at all. That that fearful malady, although originally from the ship's hold, had long since become naturalized, or domesticated, as some say, in certain places within a certain zone; as, for example, Havana, and perhaps New Orleans. That this theory or doctrine of the nautical origin of yellow fever being accepted, preventive measures were obvious, namely, *a.* naval hygiene; *b.* a modification of naval architecture, so as to admit as much light and fresh air as possible, and clearing out and preventing accumulations of bilge water, débris and dead animals, and vermin; *c.* quarantine; *d.* disinfection; *e.* municipal sanitation, always important for the preservation of health under all circumstances, but especially so in order to prevent or destroy nests and pabulum that foster the germs of disease of any kind. Yellow fever, however, will propagate in a propitious season from exotic germs, in spite of any hygienic measures, and spread extensively and fatally in a pure atmosphere, that is, in an atmosphere free from any emanations from filth, or from marsh effluvia; but only under favorable meteorological conditions not well understood.

In order to devise measures to prevent the spontaneous development of yellow fever, or any other malady of an infectious nature, *de novo*, on ships at sea, and the transmission of infection from place to place, and establish at every sea-port sanitary stations for inspection and disinfection, and that there should be uniformity and harmony in all operations in the premises, there must be, necessarily, an International Congress in which every mari time power of importance should be represented; and this ought to be called at as early a day as may be expedient or possible.

The term quarantine should be abolished, — words are useful only in respect to their signification, and the word quarantine is insignificant and barbarous; it simply means forty, and, with regard to the detention of vessels, relates to days. There are no forty days in the question, nor twenty, nor ten even, — nay, indeed, nor five! It is a mere matter of hours, for the detention of ships and passengers at sanitary stations; the precise time, to be sure, is indefinite, but by the judicious application of the means of disinfection at our command, a ship may be cleared of every germ or particle of infectious matter in from sixty to seventy-two hours. Professor Gamgee's method by refrigeration, etc., is worthy of a trial, but I have succeeded fully and perfectly in a crude way, for the want of conveniences and adequate assistance, in many instances, and failed in none. Thorough cleansing by water at as high a temperature as can be reached by the best devised means at hand, scrubbing every part it is possible to reach, then drying by artificial heat, and afterwards fumigation with sulphurous acid gas by burning sulphur in combination with superheated steam — as by Perry's apparatus. Lime, which is powerfully destructive of all organic matter, living or dead, is lastly thrown abundantly in the hold from "stem to stern," and at the same time the decks and every place that can possibly be reached, that would sustain no injury thereby, is scalded with a concentrated solution of potash. Whitewashing and painting would add something toward completing the process, and much to the appearance of the vessel. This process may be very much simplified, and at no very great expense.

I have had no experience respecting the disinfection of fine or costly dry goods; but have thoroughly disinfected clothes, bedding, etc., and delivered them to their owners in a much better condition as to cleanliness and good order than they were before, simply by water at 212° Fah. and the rays of a summer's sun.

I am compelled to say, in conclusion, that the report of the late Havana Commission shows that the eminent gentlemen composing it have done a noble work; but what they said with regard to "The Origin of Yellow Fever in Ships and Harbors" was based simply on authority not more worthy of confidence than other observers, whose declarations, based upon a large experience derived from close observation and research, may be adduced to prove the positive fact that yellow fever did originate primitively in the holds of ships on tropical seas, and it was carried to sea-port cities, towns, and other places, and under favorable conditions as to season, soil, and climate, where it became naturalized, just as an annual exotic finds a congenial soil and climate, grows to perfection, and scatters its seed to germinate and develop in due season. A denial of the *de novo* origin on ships from local sources of infection, generated in the vessels themselves, with such an array of well-authenticated facts in proof of it, must be from an impulse of pure perverseness, and a disregard of authority which is worthy of the very highest consideration. There is not a physician in New Orleans who can safely deny the fact that the yellow fever did originate in the ship

Northampton from local sources of infection that were created in the vessel itself, in transit from Liverpool to New Orleans in 1853. This ship had never been south of 40° North latitude before, and had never seen land, so to speak, from the time she left Liverpool until she approached the harbor of her destination; and Dr. Benjamin F. Gibbs of the U. S. Navy testifies to the fact in his official report that yellow fever originated inside the store ship *Relief* off Ship Island, in 1863, and introduced it at the Navy Yard, Pensacola; and I have a list of over one hundred vessels upon which yellow fever originated while sailing on the high seas, that had never touched at any place where yellow fever existed. Hence the necessity for naval hygiene and inspection of all vessels engaged in the commerce of the seas. I shall have occasion to examine the Report of the Havana Commission critically, and shall do ample justice to its able authors in a spirit of amiability and profound regard and deference, and show them and the profession that *yellow fever* NEVER *did originate from local causes* "ON LAND" *free from the seeds propagated from a foreign source.*

JUDGE J. W. CLAPP, of Memphis, said that it was not his purpose to participate in the discussion of the various questions and propositions relating to hygiene and sanitary science that had occupied the time of this body for the last several days, for he frankly confessed his ignorance as to these matters which lay outside of his accustomed range of inquiry, and indeed, as he had sat here from day to day and had heard almost every theory that had been advanced by one learned member of the body controverted by others, and a general chaos of opinion upon every important question, he had been surprised to find how small a modicum of accepted truth there is in medical science, and how much is left to conjecture.

The discussion had indeed developed one point, as to which there seemed to be but little diversity of sentiment, and that was that our food, or the means to which we resort to sustain life, when it has performed this function, becomes at once a deadly enemy to life, so that the chief end of man, temporally at least, is embodied in the inquiry, "What shall we eat and what shall we drink, and how then are we to dispose of it?"

But the limited extent of our knowledge as to matters that concern us most deeply, that has been exemplified in the discussions with which we have been entertained here, should be a source of humiliation to us all. The topic of overshadowing importance, and the one that has claimed the largest share of our attention, is that mysterious and awful pestilence that has so frequently of late years appeared in different localities in our country. We have been told by some of the learned members of this Association that the ravages of this plague may be traced far back into the past, and we know that more than a century has elapsed since it spread consternation and death in this country, seeming to ignore climatic laws and to be equally malignant in the cities of the northern and southern States; and yet impressed as we have been by the havoc made by this king of terrors, it is admitted that it has baffled the skill and wisdom of the medical and scientific world, and we know but little if any more to-day than was known centuries ago as to its origin, its mode of propagation, its prevention, or its cure. This confession of ignorance should teach us to regard with profound sympathy and condolence those cities and communities that are invaded by this incomprehensible and uncontrollable scourge, and certainly to avoid visiting them with taunts and reproaches, and exhibiting them in a light that is calculated to excite universal disgust and abhorrence. The fact that they have been visited by a great calamity, the cause or prevention of which is admitted by this learned Association to be inexplicable, furnishes no evidence that they are worse than other places in their social or sanitary condition, and certainly no excuse for misrepresentation and denunciation, but the experience of the world proves that the beam in our own eye is never so large that we cannot see the mote that obscures our neighbor's vision.

Among the latest and greatest sufferers, said Mr. Clapp, are the inhabitants of the unfortunate city in which I reside, and being honored as one of its representatives in this Association, and as one of its political representatives, I cannot remain silent when it is depicted before this assemblage as a place, the defilements and pollutions of which cannot be exaggerated, and the grievous afflictions of which are attributable to this extremely filthy condition. We have virtually been exhibited as a horde of social lepers, immersed to the chin in filth, and as either insensible to our degradation, or as unwilling to incur the trouble and expense necessary to our relief. Now, whilst I do not undertake to say that the sanitary condition of Memphis is what it might and should be, I do assert that she is no worse in this respect than a majority of the towns and cities of the United States, and of the world, and I resent the sweeping remarks that have been made as a gross wrong and outrage upon her people, and were the same sort of microscopic investigation applied to her sister cities that affect to regard her with horror, not one of a thousand could stand the crucial test.

This wrong does not stop with the caricature of our condition as to cleanliness that has been presented, but our great staple, the king of southern commodities, the regulator of our foreign exchanges, is to go out into the markets of the world stigmatized and branded as a "*fomite*," saturated with pestilential and contagious poison, although it must be admitted by every candid mind in this assemblage that not a solitary instance has been cited supported by trustworthy evidence, that baled cotton has ever been the medium of propagating yellow fever or any other infectious disease.

But if the filthy condition attributed to Memphis be admitted, it is very certain, judging from the contrariety of views that have been expressed, that this Association is not prepared now to assume the responsibility of announcing that filth or malaria ever did or can generate the specific virus of yellow fever, and it is undeniable that instances have been referred to which seem to negative such a hypothesis. Amongst others is the case of Holly Springs, Miss., a town proverbial for its cleanliness and beauty, located upon a high sandy ridge and out of the reach of malarial influence, where it was said, and believed by high medical authority, it was impossible for the fever to find a resting place, and yet in 1878 that town was decimated by this scourge.

It is an old adage that "when doctors disagree, who is to decide?" In this body, representing the sanitary and scientific wisdom of the nation, it has been asserted and denied that filth has anything to do with the origin and prevalence of yellow fever. It has been asserted and denied that it was contagious. It has been asserted that it was in every instance an exotic and imported malady; and others have insisted that it had become naturalized, and developed itself spontaneously under certain conditions. Some have insisted upon the sovereign virtue of stringent quarantine regulations; whilst others have denounced them as arbitrary and worse than useless.

Now in this Babel of opinion, how are the people of Memphis to act? One will say, your city is built upon privy vaults, many of which are very deep, and this is the source of your trouble. Another will point to the Nicholson pavement as the origin of our woes. It is true there are many privy vaults within the limits of the city — but what city is without them? Some of them too are deep, because sanitary wise-acres told us the deeper the better. Whatever may be the cause of our suffering, we are not only willing but anxious to do all we can to remove it. Pestilence and financial mismanagement have swept away thousands of our people and millions of our money; but stricken and impoverished as we are, we revolt at the idea of being held up to the world as mendicants going around among the cities of the land begging alms; and whatever opinion may be entertained of us abroad, we do not regard ourselves as sinners above all others, and doomed to destruction for our delinquencies. So far from regarding our city as dead, we have an abiding faith in its future; and were this Association holding its sessions there now, it would be amazed at our wonderful recuperative power, and would find itself in one of the busiest marts of trade on the continent.

What we desire to know is, how best to apply our limited resources for sanitary purposes; and we ask that the National and State Boards of Health shall at once send a committee, composed of men of approved scientific and sanitary knowledge, who shall make a thorough investigation of our condition, and suggest what they believe to be the source of our trouble, and the means necessary for our deliverance, and we then promise to do all that can be done in our circumstances to avert another visitation of the plague, and, God helping us, we expect to succeed.

DR. WM. BAILEY, of Louisville, Ky., spoke as follows: The interests of truth will be best subserved by every member of the Association speaking out freely his convictions, however heretical they may appear to be.

For my own part quarantine is exceedingly repugnant to me, and I sincerely deprecate it unless in cases where the efficiency of it can be most certainly demonstrated.

I desire to submit to the Association some propositions which, if true, should have much to do in determining the quarantine restrictions. In the first place, I do not believe that yellow fever is in any sense a contagious disease, and therefore I do not think it should be the subject of quarantine.

I do not believe there is any causal relation between cases of yellow fever any more than there is between cases of so-called malarial fevers.

In other words, cases of yellow fever are dependent for their production upon causes acting independently of the sick.

There is no product from a person sick with the disease that can generate the disease in another person. In support of these views I adduce the fact that the disease is not ubiquitous, but that its habitat is determined by latitude, longitude, and altitude.

That no contagious disease is so limited, but prevails wherever the sick are brought in contact with the well unless they are in some way protected.

I also submit that all specific diseases that are propagated at any time by contagion are never propagated in any other way.

That if a specific disease is ever, even in one instance, developed without being dependent upon contagion, then that disease is not nor can it ever be propagated by contagion.

It is a well established law in etiology that all endemic diseases are dependent for their production upon some cause operating upon the people within the limited area of its prevalence which does not extend its influence beyond these limits. This law is equally true when applied to diseases that have a wider range than is ordinarily assigned to endemics, provided these are limited by metes and bounds beyond which they cannot go no matter how intimate the peoples of the two districts.

This is the fact in regard to yellow fever. A certain degree of temperature is absolutely essential for its production, and hence it cannot be contagious in its character.

I defy the world to show a disease that is undoubtedly contagious which is dependent upon heat for its production.

The inhabitants of a city so thoroughly scourged as even Memphis has been have no fear of this disease after a certain range of temperature is shown by the thermometer. We have it in proof here that this disease is perennial in the tropics where the degree of temperature is always high, and it is also known that places there are exempt which by their altitude have characterizing them a much lower range of the thermometer. Cities situated in temperate zones may occasionally have this disease, but only when their climatic history conforms more or less nearly to the climate of the tropics.

To my mind nothing is more clearly proved by history than that this disease can prevail only when the climatic conditions are favorable for it. I believe very confidently that the disease is altogether climatic in its origin, and hence that we should have to do with the modification of the products or effects of climate rather than trying to prevent its spread by quarantine. I challenge the consistency of you physicians who pretend to believe in the personal non-contagion of the disease, and yet advocate the forms of quarantine now in vogue.

If the disease cannot be communicated from one person to another, then how is it possible for the sick man to infect his clothing so that it may be the means of spreading the disease?

It is a very common practice for the quarantine authorities to board our trains running north and compel persons sick with the yellow fever to go to a yellow fever hospital for the purpose, ostensibly at least, of isolation and to have their clothing disinfected.

How came their clothing infected? Again, for emphasis, allow me to ask, can the sick man infect his clothing when he cannot communicate the disease to his fellow passenger or nurse?

Yet this is what you pretend to believe and what you practice. If he does not infect his clothing and articles in contact with his person, and that, too, by reason of that contact, then why do you either burn, destroy, or disinfect his clothing, and at the same time allow other men's clothing made of the same fabrics and from the same district to go unchallenged?

You practice also a singular method of isolation in these cases of yellow fever. You place them in hospitals and surround them by nurses, doctors, and visitors, who are themselves unprotected.

I personally know it to be the case in Cincinnati and Louisville that the persons in direct contact with the sick in 1878 were as liable to the disease as the same number of persons in the cities were.

If by the isolation you protected the inhabitants of the cities, please tell me who protected the isolators?

How would such a method of isolation serve to check the spread of small-pox? Suppose you take a number of cases of this latter disease and place them in hospital, surround them by a corps of nurses and doctors who themselves have neither had the disease nor been vaccinated, and in addition to this you allow any number of charitably disposed citizens to visit them at their unrestricted pleasure; and again allow the physicians to spend much of their time in the dead room making minute post-mortem examinations and closely analyzing and inspecting the tissues, blood, various secretions, excretions, and discharges by chemistry and microscopy. And then tell me how such isolation would succeed in arresting small-pox? Yet this is precisely what we do with yellow fever.

Louisville, Ky., in 1878, received within her corporate limits twenty thousand refugees from the infected districts. They pervaded and overflowed her hotels, boarding-houses, and private residences with baggage packed from cellars to garrets. And yet not one single case was developed by the contact. Moreover, she established a yellow fever hospital, at which she treated over eighty cases of the disease, and that, too, by doctors and nurses who were not protected, inasmuch as a large majority of them had never even seen a case.

This was the case with the resident physician, who gave unremitting attention day and night to the sick, but finding time to make ten or more dissections, making in each case observations with the microscope upon the tissues of the various organs. He was also studying the disease at the bedside, examining the blood, secretions, black vomit, and dejections very constantly.

Her citizens, also, in large numbers daily ministered to the sick in kindly offices.

Many refugees sickened, and some died in the city, besides those in hospital as stated above. All these were very carefully attended by our people, and yet not one authenticated case of the disease was developed from these cases and from this intimate contact.

Do you still tell me that this is a contagious disease? It is true that Louisville had an endemic very similar to, if not identical with, yellow fever; but the fact that the cases could not be traced to any cases imported, and that the disease was so strictly endemic as to be confined to very narrow limits, although intercourse with other parts of the city was not in the least restricted, and the fact already cited of so many cases without in one instance developing the disease, to my mind adds very strong additional proof of non-contagion.

Cities that practice quarantine do not show decided convictions as to essential points.

In all the papers read here advocating this measure, no one has even mentioned the necessity of placing the quarantine station in the hands of persons not subject to the disease because of previous attack. If by quarantine you protect the cities, what, in the name of reason, is to protect your protectors? Where in your vicinity will the people consent to your establishing your station to protect yourselves at their expense?

Is not this expecting too much of them? Will not the same spirit that induces the city to quarantine also cause each vicinity, for its own preservation, to institute such measures as may be necessary to prevent you from locating any station in its midst. Quarantine must carry all its legitimate consequences, and among them is that each city, town, or district may drive back the refugee, fleeing, it may be, for his life, to sicken and die in his own infected home.

I have no fear of yellow fever from personal contact with the sick, and hence instead of establishing cordons I would rather open wide my doors and receive the afflicted into the bosom of my family, and afford, so far as was in my power, the aid and sympathy so greatly needed. Every better feeling of my nature prompts me to this course, and as long as I am blessed with a home I trust there will be one place where the homeless refugee may find shelter.

I am proud that my own city so nobly and generously pursued this course during the epidemic of 1878, and many afflicted hearts are to-day asking benisons upon her.

I think it possible for a section of climate to be transported, and thereby the disease may be engendered away from its home. To illustrate what I mean: I think a steamboat or other vessel which is filthy (Dr. A. N. Bell has showed us how these vessels can be filthy) may be infected by being in a tropical or yellow fever district, and without proper cleansing or ventilation carry its infection to a remote location and there engender the disease as it would have done before the transportation.

It is not necessary for infection that yellow fever should have been on the vessel previous to its leaving the infected district. The vessel became contaminated through climatic influences and not by cases of sickness, else why did not our yellow fever hospital become so infected as to give at least the semblance of a case out of the hundreds who visited it. We had illustrations of this transportation upon our western rivers in 1878.

It may be possible for a closed car to carry an atmosphere from the infected district to one not infected, and thereby produce cases of the disease. You will readily perceive that in place of quarantine I would practice the extremest cleanliness and insist upon the completest ventilation, in order to protect against the disease, instead of quarantining against an imaginary germ.

I would very strongly commend such work and measures as have engaged the attention of the auxiliary sanitary association at New Orleans.

I believe that an ounce of sanitation is worth more than a thousand pounds of quarantine in the prevention of yellow fever. I hope the day is not far distant when such cities as Memphis and New Orleans will be completely redeemed from the dominion of this scourge. When sanitary law and not quarantine shall reign supreme.

Dr. Taney, of New Orleans, asserted that from the earliest times to the present day there has been no progress made in positive knowledge. He denied that there had ever been anything settled in regard to yellow fever, and this because every one goes his own way, and all are alike and equally in the dark. If we are ever to accomplish anything, there must be united effort in the matter, and to secure this, the General Government should take the chief direction and control in the matter. We should all combine our efforts to sustain the Government in this work, and contribute towards the carrying out of its investigations and its regulations. Individual efforts in diverse directions amount to nothing.

Dr. E. M. Hunt, of New Jersey, said he desired to ask the following questions: —

First. Are not the things upon or in the vicinity of persons who have had the yellow fever more dangerous than articles in the same town?

Second. If so, has not the *person* a relation to the surcharging of articles called fomitic?

Third. Can a person's clothing become fomitic through a person having yellow fever, and yet dirt in his skin, his hair, whiskers, etc., be warranted as having no fomitic capacity?

Dr. Bailey said that the disease was climatic, not contagious, therefore the climate must be conveyed in order to convey the disease.

Dr. Peters, of New York, said that the conveyance of the disease was more like typhoid fever than anything else. The typhoid fever could be treated in a hospital without conveying it to any other person, but let the discharges go into the drains and they become infective in a few days from decomposition. So in yellow fever. There must be something from the person. The poison being hidden away, fomenting, becomes the seed of a great epidemic. This was middle ground between the extremists on either hand. In 1878 the fever was carried into many towns. In some it spread, in others it did not. Though New York did not now have the fever, it had had some close risks. The foot of Rector Street was historical in relation to yellow fever. The history of several epidemics in New York was referred to as proving the positions taken. New York, up to 1832, was again and again afflicted with yellow fever. Health officers and physicians died, and importation was shown in nearly every case, but there was always filth ready to receive and diffuse it.

The Association then adjourned to half past nine o'clock Friday.

FRIDAY, NOVEMBER 21.

The Association met at 10 A. M., the President, DR. CABELL, in the chair.

Prayer was offered by REV. F. A. SHOUP.

Dr. BILLINGS presented a list of candidates recommended by the Executive Committee, who were elected members of the Association.

TREASURER'S REPORT.

Dr. Billings stated that he had received Treasurer Baker's report, which he moved to refer to an auditing committee. Carried, and Drs. Stephens, Bell, and Elliott appointed.

Dr. Billings also announced the titles of the following papers recommended by the Executive Committee to be referred to the Publishing Committee of the Association, time not admitting of their being read before the Association.

"Post-mortem Examinations and their Relations to Public Health," by Dr. E. G. Janeway, New York.

"Action of Vegetable Acids on Tin," by Prof. Charles E. Monroe, United States Naval Academy.

"Water Supply," by J. Chandler, M. D., Memphis.

"International Quarantine," by Dr. Bushrod W. James, Philadelphia.

"The Most Effective Way of Preventing the Spread of Venereal Disease," by the same.

"On the Sanitation of Nashville," by J. Berrien Lindsley, M. D.

DR. CABELL'S RESIGNATION.

DR. CABELL, President of the Association, who was elected a member of the Executive Committee yesterday, stated that having declared his purpose to resign his position as President of the National Board of Health at the close of the current year, owing to the onerous nature of the duties of his position in the medical school of the University of Virginia, he had at first supposed that, being released from the one position, he would be at liberty to answer the lighter duty of the other, and had, therefore, signified his acceptance. On reflection, however, he was satisfied that the same reasons which compelled his declination of the one position would also render impracticable the acceptance of the other; and, therefore, much to his regret, he felt compelled to tender his resignation as a member of the Executive Committee, and ask the Association to order an election to fill the vacancy. An election was thereupon ordered, which resulted in the choice of Dr. J. G. Thomas, of Savannah.

QUARANTINE IN ARKANSAS.

DR. R. G. JENNINGS, of Little Rock, read a paper on "Quarantine and its Results in the State of Arkansas, in 1879." (See page 121.)

Dr. D. C. Halliday, of New Orleans, made a report of the committee of the New Orleans Medical and Surgical Society, on the question of "How to Deal with a City in the Yellow Fever Zone in order to prevent the Appearance of a First Case."

HOSPITALITIES OF THE NASHVILLE, CHATTANOOGA, AND ST. LOUIS R. R.

Dr. Deering J. Roberts, announced that an invitation had been extended to the members of the Association to visit the city of Chattanooga, a courtesy on the part of the Nashville, Chattanooga, and St. Louis Railway, through its efficient Superintendent, Maj. J. W. Thomas. Parties desiring to avail themselves of this courtesy are requested to hand their names, at any time during the meeting, to Dr. J. Berrien Lindsley, who will furnish them free passes both ways, and they can then, singly, or in parties of two, three, ten, twenty, or more, leave here on every train, remain in Chattanooga two, three, or more days, and return whenever they desire.

CAMPS AND DEPOPULATION IN YELLOW FEVER.

Col. John F. Cameron, of Memphis, read a paper on "Camps and Depopulation at Memphis, in the Epidemics, 1878–79." (See page 152.)

INSPECTION OF STEAMBOATS AND OTHER VESSELS.

Dr. A. N. Bell, of New York, made a few remarks on the Inspection of Steamboats and other Vessels. To illustrate his subject, he had some rough drawings of the construction and internal arrangements of various vessels, showing where the danger from filth was most pronounced and least accessible. After explaining from the drawings the different constructions, and the apartments to which inspections were unfortunately too commonly limited, he pointed out the lurking places of filth, infected or otherwise, to be in entirely unventilated portions, the *bilge*, lying under the flooring, between it and the keelson; and the *limbers*, the spaces between the timbers, or ribs, as they are sometimes called. These hidden places of vessels, and of steamers especially, were shown to be the final receptacles of the drippings of oil in the care of the machinery, the débris of cargoes, the leakage from without, and the wholly unventilated stagnant mixture known as *bilge water*. He stated in this connection that the promotion of commerce was consistent with the promotion of health in this, as in other particulars. No ship, he would say to those interested in commerce, was a good investment, which was not so constructed as to be a healthy abode for men. Stagnation, death, and decay, went hand in hand in both the material and the personnel of commerce everywhere. In showing these receptacles of filth on board vessels, he also described how, in the rolling at sea, the foul mud stirred up in the bilge water, and which is so offensive on account of the decomposition of the filth which it holds in solution or mixture, is thrown up into the limbers between the lining and outside planking, and clings to the closed in and inaccessible spaces. It is evident, he said, that the practice of pouring carbolic acid or anything else into the pumps was altogether inadequate to cleanse these recesses, extending as they do, from the keelson on either side of the vessel, in many cases above the water line. In illustration of the amount, he mentioned his having, a few years ago, superintended the work of breaking out and cleansing the old steamship *Illinois*, in order to fit her for a floating boarding station for the New York quarantine. The filthy mud removed from her limbers was estimated at the enormous amount of one hundred and twenty tons, and it was so offensive as to be a nuisance to the neighborhood, and required speedy removal.

He next showed how the barges on the Mississippi River are constructed, their liability to the most unhealthful conditions, and the danger to the public on account of infected cargoes, subject as they frequently are to the emanations arising from tons of filth in process of decomposition, saturating everything on board.

He referred, in conclusion, to some modern built iron ships, in particular, without bilges and limbers, but still subject to dangerous accumulations, on account of numerous closed spaces, accessible to drippings, leakage, and foul emanations, requiring scrupulous care on the part of their masters, which, while less subject to contamination than the other classes of vessels described, were, nevertheless, like them in the necessity of constant sanitary supervision ; and no exception to what he conceived to be *the* only means of preventing the spread of disease by commerce, namely : a system of searching inspection, and the cleansing and disinfection of all filthy vessels *at the port of departure, at all ports, and at all seasons, before being allowed to take cargo or passengers on board.*

THE NATIONAL BOARD OF HEALTH.

DR. FOLSOM said he had been directed by the Advisory Committee, to offer the following preamble and resolutions : —

Whereas, the National Board of Health has, in accordance with the law which created it, requested the advice of the American Public Health Association regarding the form of a permanent national health organization of the United States, including its relations to quarantine, both maritime and inland ; and,

Whereas, the opinions of the Advisory Council of the Association, upon the subject of health legislation, collected and presented to this body through Dr. J. M. Toner, Chairman of the council, have been duly considered ; therefore,

Resolved, that, in the opinion of the American Public Health Association, the present National Board of Health has been of such vast service to the country, that it is not expedient to make any essential change in its organization, and that any minor improvement in details should be left to the Board itself.

2. That the investigations which have been commenced by the Board are approved and should be continued, and that similar investigations should be undertaken by it in the consideration and prevention of other diseases as well as yellow fever.

3. That Congress should appropriate sufficient funds to enable the Board to employ the best talent and apparatus in such scientific and practical inquiries.

4. That the operation of the existing quarantine law, and of the rules and regulations prepared by the National Board of Health on that subject, have accomplished great good, and that no change in the law should be made without the most careful and serious consideration.

5. That, in the opinion of this Association, the national quarantine should be under the direction of the National Board of Health, and of an executive committee to be selected by that body.

6. That this Association has no suggestions to make with reference to any amendments to existing legislation in regard to quarantine, preferring that they should come from the National Board of Health, as the most competent body to advise whatever may be best.

7. That it is expedient for the National Board of Health to call an International Congress for the discussion of the very important subjects of international sanitary quarantine, etc.

8. That it is the duty of the General Government to build, equip, and conduct, at the mouth of the Mississippi River, a quarantine station at such a place as may be designated by the National Board of Health.

9. That the Secretary of this Association be instructed to forward to the National Board of Health a certified copy of these resolutions, together with the reports and documents of the Advisory Council, and that the Executive Committee be instructed to take such action, during the next session of Congress, as may seem best suited to promote legislation in accordance with these resolutions.

Dr. Folsom also read the following resolutions, but said that, as the points contained in them were included in those of the Advisory Committee, they were not recommended for adoption : —

By Judge J. W. Clapp, of Memphis : *Whereas*, the appearance of yellow fever as an epidemic in Memphis, Tenn., during the last two summers, has created an apprehension that the ill fated city may continue to be visited by this scourge, the effects of which extend far beyond the infected locality and assume national importance, not only as regards the public health and safety, but as affecting our inter-State commercial relations ; therefore,

Resolved, that this Association recognizes the fact that the sweeping epidemics which have occurred in Memphis during the past two summers have been of such a character that they are no longer local in their bearings, but *national;* therefore, it is respectfully urged upon Congress the early consideration of measures looking to the prevention of similar epidemics at that point.

By Dr. Gibbs, U. S. Navy : *Be it resolved by the American Public Health Association*, that it shall be the duty of the National Board of Health to designate, for the information of the President of the United States, such foreign ports as shall, by said Board, be deemed infected, in the sense that all vessels, arriving from the same into the sea-ports of the United States, shall be subject to quarantine laws. The previous sanitary history of said foreign ports, based upon consular and other information, shall be considered by the National Board of Health in designating such infected ports or localities.

Be it further resolved, that it shall be the duty of the President of the United States, upon being so advised by the National Board of Health, to cause a general proclamation to issue, in which a list of such ports and localities shall be declared infected in their commercial relations with the sea-ports of the United States, for a period of six months, namely: from the first day of May until the first day of November.

Dr. S. S. Herrick, Secretary of the Board of Health of the State of Louisiana, gave an outline of the cases of yellow fever occurring at New Orleans in 1879.

Those reported to the Board of Health amounted to forty-one, to which number should probably be added seven others which occurred in one family, living in the Fourth District, between June 16 and July 17, or previous to the recognized outbreak of the fever. These cases were of so mild a type that they were not suspected to be yellow fever until after the appearance of a series of cases at Mississippi City, commencing July 6, the first one of which was in the person of a girl just returning from service in the family above mentioned.

There had been a previous case in the latter part of March, from the steamship *Baltimore*, having sickened after the vessel was released at quarantine; but no connection could be traced between this and the subsequent ones.

The first recognized cases sickened July 21st and 23d respectively, in the neighborhood of the seven already mentioned, and a number of others followed in the same locality in rapid succession. There was then a pause of nearly two weeks, until August 12, when a young man fell sick in the second district, more than two miles away; but it transpired that he had worked in the disinfection of the infected locality. No other cases followed near his residence.

In fact there was but one locality, in the Fourth District, which could be declared as positively infected, though one or more scattered cases occurred in every one of the other six districts; but they were clearly traceable, with four or five exceptions, to the above named locality or to Morgan City. Cases lately arrived from that place, previous to the establishment of quarantine on the railroad, occurred at no less than four different points, distant from each other; but no spread of the disease followed in the same neighborhoods. The infected portion of the Fourth District might be included in a circle of a diameter probably not exceeding half a mile; and in the absence of proof of importation, it may be presumed that the infection survived from the epidemic of 1878.

ENFORCEMENT OF QUARANTINE.

Dr. Samuel Choppin, of New Orleans, discussing the report of the Committee of the New Orleans Medical and Surgical Association, said no quarantine could be effective, on account of the laxity in the execution of the laws and the opposition of commercial interests. The yellow fever was thus carried to New Orleans, and it was thus carried to Memphis.

Dr. Lloyd Howard, of Baltimore, referring to the difficulty of enforcing quarantine, said there were so many ways of spreading the infection that this difficulty could be easily accounted for. He mentioned sleeping-cars as an instance of this.

The President announced the appointment of the following Advisory Committee: —

Dr. R. D. Webb, Livingston, Ala.
Dr. Henry Gibbons, San Francisco, Cal.
Hon. S. C. Cobb, Pensacola, Fla.
Dr. H. F. Campbell, Augusta, Ga.
Dr. J. H. Rauch, Chicago, Ill.
Dr. Jas. F. Hibberd, Ind.

Dr. Wirt Johnson, Jackson, Miss.
Dr. D. C. Holliday, New Orleans, La.
Dr. James A. Steuart, Baltimore, Md.
Dr. Azel Ames, Jr., Wakefield, Mass.
Dr. Henry Hartshorne, Philadelphia, Pa.
Dr. Thomas C. Minor, Cincinnati, Ohio.
Dr. George Homan, St. Louis, Mo.
Dr. Edwin M. Snow, Providence, R. I.
Hon. J. W. Clapp, Memphis, Tenn.
Dr. L. S. Joynes, Richmond, Va.
Dr. Henry B. Baker, Lansing, Mich.
Dr. James E. Reeves, Wheeling, West Va.
Dr. J. M. Toner, Washington, D. C.
Dr. Elisha Harris, New York City.
Dr. Thomas F. Wood, Wilmington, N. C.
Dr. Robert Lebby, Charleston, S. C.
Dr. C. W. Chamberlain, Hartford, Ct.
Dr. S. F. Conn, Concord, N. H.
Dr. Henry D. Holton, Brattleborough, Vt.
Dr. R. Rutherford, Houston, Tex.
Dr. E. L. Griffin, Fon-du-Lac, Wis.
Dr. W. D. Middleton, Davenport, Iowa.
Dr. C. N. Hewitt, Red Wing, Minn.
Hon. Samuel Lilly, M. D., Lambertville, N. J.
Dr. A. L. Breysacher, Little Rock, Ark.
Dr. Pinkney Thompson, Henderson, Ky.
Dr. L. P. Bush, Wilmington, Del.
Dr. T. A. McParlin, U. S. Army, New York City.
Dr. B. F. Gibbs, U. S. Navy, Washington, D. C.
Dr. Stephen Smith, Nat. Board of Health, New York City.
Dr. P. H. Bailhache, U. S. M. H. S., Washington, D. C.
Hon. John Eaton, Commissioner of Education, Washington, D. C.

In the discussion of the papers on yellow fever, Dr. Jerome Cochran, of Mobile, said, in substance: In the short space of ten minutes, it is impossible to discuss any question of importance with any thoroughness. I shall, therefore, not attempt to give any proofs in support of my own opinions in relation to yellow fever, but will content myself with the mere statement of those opinions in the briefest and strongest terms that I am able to command. I must be allowed to express my surprise at the character — crude, undigested, and often antiquated and exploded — of the doctrines that have been maintained by a majority of those who have spoken upon this question. While we have still much to learn as to the natural history of yellow fever, I am obliged to hold that there are some things about it that are already positively known. Amongst these I think that we may claim to know, —

1. That yellow fever is a specific disease, caused by a specific poison.

2. That this poison is material, and therefore may be transported from place to place.

3. That this poison is not akin to our ordinary marsh malaria.

4. That this poison is not in any way the product of ordinary filth, and has no necessary association with filth as such.

5. That when the yellow fever poison is brought into a healthy community it sometimes gives rise to an epidemic, and sometimes, for reasons of which we have no knowledge, fails to do so.

6. That the only prophylactic that can be depended on is non-intercourse with infected persons, infected places, and infected things.

There are some other very important questions that I regard as still *sub judice*, — questions of very great difficulty, but of which I cannot regard the study as utterly hopeless of successful result. Amongst these, I will mention, —

1. The demonstration of the yellow fever poison either by chemical or by microscopical research; and the discovery of its physical and chemical characters, if it should prove to be an inorganic poison; or of its microscopical and physiological characters, if it should prove to be a true *contagium vivum.*

2. Whether the yellow fever poison is generated in the bodies of yellow fever patients, or whether it multiplies exclusively outside of human bodies. Besides being an interesting question in itself, its solution would decide whether yellow fever patients, separated from their clothing, would be fit subjects for quarantine detention.

3. To determine what that unknown factor is, which being present, yellow fever spreads; and which being absent, yellow fever does not spread. Two opinions have been expressed as to the nature of this unknown factor of epidemics. First, that it is some agency of climate; second, that it is some agency of filth. If it is a climatic agent, it is something different from heat and moisture. If it has any connection with filth, it is with some element of filth that is not manifest to any of the senses — that does not offend the eyes or the nose.

It has been asserted that quarantine can be so conducted as to insure the safety of communities and at the same time interfere but little with the interests of commerce. I do not agree with this opinion. On the contrary, when there is any considerable danger to be confronted I believe that there is no certain safety except in absolute non-intercourse.

Here the gavel fell.

MEETING OF THE NATIONAL BOARD OF HEALTH.

The President announced that the National Board of Health would hold an open session in the Senate chamber at 10 A. M. to-day, to which members of boards of health and sanitarians generally were invited.

The Association then adjourned until 3 P. M.

AFTERNOON SESSION.

The Association resumed business at 3:30 P. M., DR. CHOPPIN in the chair.

THE TREASURER'S ACCOUNTS.

DR. BILLINGS, from the committee to audit the report of Dr. Henry B. Baker, Treasurer, reported that they had found it correct, and moved that it be turned over to his successor, Dr. J. Berrien Lindsley, which motion prevailed. He also reported additional persons for election to membership, and they were elected.

CONFLICTING THEORIES OF QUARANTINE.

DR. BILLINGS remarked that to depend solely on quarantine or municipal sanitation would be unsatisfactory. They had yet agreed on nothing, and it behooved them, in the few hours that remained, to agree on some plan as representing their ideas on quarantine.

HON. S. C. COBB, of Pensacola, said that, as a business man, he desired to know what practical thing it is proposed to do in this matter of quarantine. If we wait until an agreement between the conflicting theories of the doctors, nothing will be done. How will you prevent the importation of yellow fever? He would answer by an effective and *intelligent* quarantine.

The National Board of Health cannot enforce their regulations at the ports from whence infected vessels come; the danger must be met and combated at our own doors. Detention of vessels at quarantine varies from four to forty days in different parts of the country. How much time is necessary? What we want is to hold them long enough to effect the object of purification, but not an hour longer.

During the last summer twenty-two ships arrived at Pensacola from Rio, three of them having cases of fever on board. The Board of Health found it sufficient to discharge cargo and ballast, thoroughly disinfect and fumigate, and then permit the vessel to load and depart; but of ninety-two vessels arriving from West Indian and South American ports none were detained more than twenty-four hours. No fever has prevailed in Pensacola this year, nor in any year in which these precautions were observed.

In their intercourse with New Orleans, restrictions were made as light as possible. Groceries and metals and similar articles were admitted without any restriction; with regard to clothing, dry goods, etc., restrictions were made rigid.

The question should be settled whether there should be certain designated ports at which all vessels from infected ports should be required to enter, such ports having a uniform code of quarantine rules; or whether they should be allowed to enter any port at pleasure, such ports having different systems of quarantine.

DR. A. N. BELL, of New York, thought that quarantine regulations should bear with as much force on the prevention of the spread of disease as against its introduction. He had never heard of an epidemic of yellow fever on board a clean ship. He favored thorough disinfection and perfect cleanliness on all vessels leaving ports where yellow fever existed or was suspected, and inspection at frequent stages of their journey. He believed that disinfection could be made effective if done properly. Heat, with proper appliances, was the most certain means; but it could be accomplished by burning a sufficient quantity of sulphur, or by chlorine if the lurking places were properly exposed. Recurring to the paper read by Dr. Campbell, he would suggest that quarantines hitherto, and, in particular, the new inland quarantines, were inconsistent with their pretended purposes. He read, from a printed copy under date of "August 16, 1879," as an example of *quarantine regulations of the present*, that "liquor, tobacco, salt, carbolic acid, lime, nails, ties, iron, soap, and ice . . . . will be admitted without detention, provided they shall have changed cars and been disinfected." Port quarantines, as commonly practiced, while equally ridiculous in some of their restrictions, are more dangerous. By congregating together, and retaining indefinitely, numerous filthy vessels, infected or otherwise, from places prolific in the causes of epidemics, to eke out their poisons; and above all, by confining persons to the atmosphere of such places until they sicken and die, is contrary to every principle of health and humanity — an obstruction to commerce and a barbarous nuisance.

THE QUARANTINE OF THE FUTURE SHOULD BE:

1. All quarantine regulations of any place whatever should bear with equal force against the toleration or propagation of disease as against its introduction, and authority to prevent the introduction of disease in any place should be equally applicable against its exportation.
2. Any vessel in a filthy condition, whether she has disease on board or not, and regardless of the port of departure, shall be considered as having a gross bill of health, and shall be treated accordingly. And
3. All quarantines should be provided with the best possible means for the care of the sick and the protection of the well.

POWERS OF THE NATIONAL BOARD OF HEALTH.

A letter from Dr. Gustavus Devron, of New Orleans, was read by the Secretary. He approves of the establishment of the National Board of Health, which he thinks should have exclusive control of the national quarantine, the State Boards of Health being left to get up statistics and to enforce the rules and regulations that might be promulgated by the National Board.

ISOLATION IN YELLOW FEVER.

Dr. J. P. Dake, of Nashville, said: —

In the very able report from New Orleans are a few points regarding which I desire very briefly to speak.

1. As to the character and value of measures to prevent the introduction of yellow fever from without, the committee very wisely favors a rational quarantine.

To my mind, in view of the evils of the shot-gun quarantine, and of a quarantine instituted and maintained against vessels, cars, persons, and merchandise, not at all infected, the use of the term rational is highly proper.

A rational quarantine is that providing against no comers or carriers, except such as we may have good reason to suspect of harboring or holding the seeds of the disease we wish to avoid.

2. The next point I desire to notice is the method of providing against the spread of the disease from its first case or early apparent focus.

If the theory of Dr. Bailey, of Louisville, who spoke here last night, be true, namely, that the yellow fever comes not by importation, is not transmissible from point to point, but occurs, like chills and fever, from an atmospheric condition strictly local, then there is no need of inquiry or action as to the protection of a community against infection from a first case.

But facts are against his theory, if never before, certainly during the pas two summers in West Tennessee.

It is necessary to understand and to be ready to *execute* the best possible method of isolating the first case from surrounding population.

Soon after the disappearance of the epidemic of last year, I was in the city of Vicksburg endeavoring to learn something of the character and habits of the disease, and while on top of the court-house viewing the field of the epidemic, an old citizen, pointing to the jail below us, with its brick wall and but one door or entrance, remarked that notwithstanding the fever had been in nearly every house around that institution, *not one case had occurred among its inmates*. I was told the number of inmates, but cannot now recollect it.

Soon after, while in the city of Memphis, being shown over the track pursued by the epidemic there, I was told that for some weeks after the appearance of the fever, and while cases were in the immediate neighborhood of the jail, not a case occurred among the inmates of that institution, till at last a culprit was admitted, having the fever at the time of his admission.

These, Mr. President and gentlemen, are significant facts. They teach most unmistakably *the value of isolation*.

In those institutions there was but little intercourse with the outer world. The doors were opened very seldom, except for the entrance of officials and the bringing in of provisions for the inmates.

The same atmosphere furnished vital air, the same sun supplied heat, the same vicissitudes of weather appeared, and the same kind of water was used in the jails as in the city outside, and yet not a single symptom of the disease appeared. No one had yellow fever within, while outside hundreds were having it within a stone's throw.

I have some recollections of a statement that once, toward the beginning of the present century, when the yellow fever had been brought to the port of New York by shipping and it had begun its march from the Point, as in times past when it ravaged that city, the authorities constructed a high, close, board fence, extending from river to river, as a barrier, or in more polite parlance, a *cordon sanitaire*, and that the disease, extending up to it, never passed beyond.

And it is said that also, in the years long past, the yellow fever was brought to the city of Providence by shipping from the West Indies, and, having gained a foothold near the water, the local authorities constructed a high, close, board fence around the square in which the cases were located, preventing ingress and egress except with great care, and that not a single case occurred outside the extemporized *cordon sanitaire.*

In regard to these instances of isolation in New York and Providence, there may be gentlemen present much better informed than myself.

I may be mistaken as to the facts, and shall be pleased with any corrections made.

Last night, when I asked Dr. Thornton, of Memphis, what steps the local authorities had taken there to prevent the spread of the fever from its earliest *foci*, I desired the information for myself and for this Association, as to the *efficacy of isolation.*

It appeared to me, as I presume it did to others reading daily reports from our sister city, that adequate efforts at isolation and arrest of the disease were not made before the adoption of the measure or announcement of the necessity of *depopulation.*

Certainly no right feeling person, away from the scenes of death and dismay in the city of Memphis, is going to say one word by way of censorious reflection upon those brave men who stood at their posts and fought for their people when so many fled, as well able to stay as themselves; but in the interest of sanitary science, and for the good of Memphis and other places and peoples in the future, it is proper for us to inquire if all was done that should have been; and if there be any good in a more thorough isolation than was practiced there.

I have been told by a well-informed and public spirited citizen of Memphis that during the illness of Judge Ray, one of the earliest cases of fever this year, dozens of people, friends of the invalid, went daily to inquire after his condition; that he saw them often in the street cars returning from such visits, even after it was well known that he had yellow fever.

I trust, before this discussion is closed, we may hear from gentlemen who have had experience in measures of individual or focal isolation.

If quarantine is important, this is no less so. The former could not possibly have saved Memphis from the epidemic this year, while the latter might possibly have done so.

THE EPIDEMIC OF 1822.

DR. ELISHA HARRIS, of New York, speaking of the yellow fever epidemic of 1822 in New York, said it was true fence barriers had been erected for the purpose of staying the pestilence. It had been found necessary to move the fence every day, the advance of the fever being about fifty feet a day. He thought that if any future epidemic should break out in New York or Brooklyn this same system of erecting barriers would prevail.

DR. PETERS said he well knew the particulars of the fever in New York in 1822, and the barriers erected. The boarding did help stop the fever, but when the fever poison reached the mass of pure air in that part of New York near Chambers Street, then very thinly settled, the poison was diffused in this pure atmosphere and died out. This was a more formidable barrier than the board fences.

STATE RIGHTS AND A NATIONAL QUARANTINE.

Hon. E. A. James, of Chattanooga, addressed the Association as follows: —

Mr. President and Gentlemen of the Association, — I have been listening with a great deal of pleasure for the last few days to the reading of many very learned and erudite papers and speeches from eminent gentlemen upon the subject of epidemic diseases, and have been greatly instructed thereby. And from the conflicting opinions of the many gentlemen so distinguished in medical and sanitary science, I have been convinced that yellow fever is epidemic, exotic and indigenous, foreign and domestic, climatic and anti-climatic, national and international. And, so believing, I am in favor of that government having the greatest power and longest purse taking charge of the great work of the control of epidemic diseases. The Constitution of the United States says: —

"The Congress shall have power to regulate commerce with foreign nations and with the several States."

The Constitution confers no power to make sanitary regulations of any kind, and yet the power to coöperate with foreign nations, to make general regulations applicable to foreign commerce, in all its ramifications, for the preservation of public health and commerce, prevention and spread of disease, to enter into conventions with foreign nations, to establish commissions of inquiry for that purpose, is admitted. The power grows out of the fact that it is a power incident to and necessary to the general powers granted. It is the power to repress or to prevent that which materially interferes with and may destroy commerce. The same power necessarily flows from the power to regulate commerce between the States. Epidemics are of themselves destructive of almost all commercial intercourse. The object is general, and, therefore, one properly within the sphere of the Federal Government. The only question is: whether or not it has been granted. It is as clearly inferable and as clearly incident to the power to regulate commerce between the States, as the power to provide sanitary regulations, coincident with the foreign commerce, is incident to and inferable from the grant of power to regulate commerce between the United States and foreign nations. We spent millions to make the Mississippi the highway of twenty States, and then pause on the brink and declare that there is no power to make the appropriation available. The States have no such power, for their authority is infra-territorial and ends with the border of each State. This evil is general, and affecting Memphis, New Orleans, or Chattanooga, also affects the surrounding States and the national highways, the Tennessee and the Mississippi and their tributaries. The grant of power must carry as an incident all that is necessary to give it effect, the regulation or removal of all contemplated and of all newly-arising obstacles which would render nugatory and void the powers granted. Being general, and not local, it is a proper case for the federal, and impossible to the local governments, which can at most only coöperate within their own territory. This power has been granted because it is incident to that already granted, and without its exercise that power must come to naught whenever an epidemic supervenes. Therefore, I am in favor of the exercise of this power by the National Government in the permanent establishment of a National Board of Health and its maintenance, with all the powers necessary to effect the preservation and promotion of the general public health by quarantine, and any and all means that said Board may think necessary.

In the epidemic of 1878, when the people of the country did not understand the disease any better than the physicians (laughter), they got scared and fell back on the barbarian's right of self-defense, and refused the privilege of establishing a camp two miles out from Chattanooga, on the high lands. A camp was established, however, and that night citizens with shot-guns went over and burned it down, and swore one should never be established there. The camp was near the Georgia line, and men with shot-guns walked over from Georgia and crushed out Tennessee sovereignty. Another camp was established, and the right of eminent domain maintained over that camp by shot-guns. [Laughter and applause.] In case of an epidemic there must be some central power which will be respected and can enforce its mandates. But when the matter is left to some "Jigadier Brindles" or cross-roads magistrates, public health could not be maintained. He knew the reason why the railroads hated to ask Congress for a national quarantine. If they had done so it would be said: "Ah, you are agin State rights; you are agin the Legislater, and we'll restrict your trade and travel and ruin and bankrupt you." Now, he came up there to ask men who did n't own railroads to any considerable extent, he presumed (laughter and applause), to do that which would promote the public health. He was a Democrat, and that was why he belonged to this Association. [Laughter.] He was opposed to Murat Halstead spelling nation with a big N, and he was still further opposed to spelling State with a big S, if epidemics were to run riot over the land.

Dr. Jerome Cochrane, of Mobile, approved the resolution in general, though some of its expressions needed modifying. The National Board of Health had the right to quarantine against foreign ports, or to prevent the carrying of the fever from one State to another, but no right to lift a finger to prevent the fever from being carried from one part of a State to another. Their measures were all supplemented with more or less rigorous rules of State and local boards, and efficient work by the railroads. The National Board of Health had endeavored to have adopted a uniform system of rules and regulations. But circumstances altered cases so greatly that what was required one year or at one place would not be required another year at another place.

Dr. O. R. Early, Columbus, Ky., said that in the consideration of this subject it was important to go back and study facts which have occurred in the past. In 1855, the ship *Ben Franklin* arrived at Norfolk for repairs. While lying at the wharf at Gosport, opposite Norfolk, she was pumped out dry, her bilge water flowing into the river. The fever broke out in Norfolk within a week afterward, beginning at a point just opposite where this bilge water found its way into the river. In 1878, a ship arrived at New Orleans with a clean bill of health, having no sickness on board. Within three days after her hatches were opened, her crew were taken down with the fever.

In view of these facts and others like them, he had thrown his views into the form of a series of resolutions, which he offered, not desiring to have them discussed, but that they might go to the Executive Committee in regular course: —

Whereas, There being a diversity of opinion as to the cause of yellow fever in this country, at the same time the large majority acknowledge that its development is dependent upon foreign spore or fomite, hence we all recognize the necessity of keeping at a distance this fecundating or germinating agent, and we know of no more efficient agent or action to effect this; therefore,

Resolved, That this Association earnestly and respectfully ask the National Board of Health to establish, at the proper time, an efficient, systematic, and judicious quarantine at all ports of entry or approaches to this country.

Resolved, That the National Board of Health be also requested, if it be in their power, either as an organized body or through Congress, to forbid by law, enacted for this purpose, vessels being freed from their bilge-water within the jurisdiction of this country, unless it be absolutely a necessity to preserve the crew and ship from destruction.

Resolved, That the National Board of Health be also requested to place upon all the avenues of approach to this country medical men as sentinels, who are fearless enough to discard private interest in the performance of their public duty when they clash with the public safety.

As an evidence that yellow fever was sometimes carried by *the person*, and not necessarily by his effects, Dr. Early mentioned the case of a man who left Vicksburg, where fever was prevailing, for Jacksonport, Miss., leaving his baggage to be forwarded by a different route. Nine days after he was attacked by fever. He was stopping at a house where a large number of ministers were stopping, together with their families and servants, none of whom took the disease.

The Association here adjourned until 7.30 P. M.

NIGHT SESSION.

The Association reassembled at 7.30 P. M., DR. CHOPPIN presiding.

The following were elected new members: Gen. Thomas T. Smiley, Dr. Montgomery Baxter, and Dr. Thomas L. Maddin, of Nashville.

WIDOWS AND ORPHANS OF PHYSICIANS.

A report from a committee appointed at the meeting of the Association at Richmond last year, to collect and distribute money for the relief of the widows and orphans of physicians who died during the epidemic, having been called for, DR. HEWITT, of Minnesota, chairman of the committee, reported that no action had been taken by the committee, because no cases requiring relief had been brought to their notice, and also because it was understood that Dr. Peters, of New York, had collected a considerable amount of money, which he was using for that purpose.

Dr. Peters said the movement with which he was identified originated in the Medical Society of New York, each member of which made a small contribution for that object. Afterwards considerable sums were received by him, being unexpended balances remaining in the hands of the Mayor of the city of New York — from the Chamber of Commerce of New York; from the Masonic lodges of Richmond, Va., through Dr. Cabell; and from Hon. W. M. Evarts, Secretary of State, being the unexpended balance of contributions by foreign donors and other parties, amounting in all to between $6,000 and $7,000. From the newspapers and other sources was obtained a complete list of the physicians engaged; next a list of deaths was obtained, and with this list the name of every widow of a physician was procured, amounting to one hundred and one; of which number about thirty were in need of, and obtained such relief as their circumstances seemed to demand and the means in hand would allow. It is worthy of remark that none of these ladies sought aid as mendicants, but all made efforts to provide for their own necessities, and, as soon as practicable, reported to him, expressing the desire that the proffered relief might be extended to others whose necessities were greater.

The Medical Society of New York do not desire to become the head centre and distributer of this fund, but prefer that each State should have its own separate fund, and shall make provision for those within it own borders.

WORK OF THE NATIONAL BOARD OF HEALTH.

The discussion of the resolutions offered at the morning session by the Advisory Committee was resumed.

Dr. S. C. Cobb, of Pensacola, Fla., said the people on the seaboard knew more about the value of the benefits that had been derived from the aid of the National Board of Health. Foreigners occasionally endeavored to break the quarantine, but the law was sufficient to be enforced. The sum of $5,000 had been appropriated by the National Board of Health, but of this sum only $2,000 had been used. Pensacola was a small place, but a number of foreign ships landed here. Inspection stations had been established at Tampa, Pensacola, Key West, and Jacksonville, along a line of coast of 800 miles. Each ship was charged $5 for inspection. He thought it better that this work should be undertaken by the General Government, as frequent municipal elections and consequent changes in inspectors were not wise.

Dr. Lloyd Howard, of Baltimore, said that the object of these resolutions, as he understood them, was to give a hearty indorsement of the National Board of Health, and he thought there was none who could not give it heartily. He was sorry that the recommendations of this Association, last year had not been carried out in the entire isolation of the first case of fever in Memphis. The Association had not been informed of the actions of the National Board as fully as he had hoped; yet, with the knowledge before him, he would cheerfully vote for the resolutions.

Dr. Elisha Harris, of New York, said that the duty of this country in calling an International Congress was wise, and he hoped the resolution in that regard would be fully indorsed.

Dr. Pinkney Thompson said: —

Mr. President, — The subject of this report is one of great importance. Permit me to say that I will yield to no one in esteem and respect for the National Board of Health. I am profoundly impressed with the necessity for such an organization. The need is urgent and absolute. Recent events are conclusive to all who are familiar, as I am, with the beneficent acts of this National Board in the trying scenes of last summer and the early autumn. Doubtless I am safe in saying that great and varied good was done by this board, which could not otherwise have been accomplished. Lives were saved and suffering relieved in Memphis during this year's ravages of yellow fever, mainly owing to the coöperation and material aid given by this body. Influence was exerted, and work was done, which were beyond the power not merely of the people of that ill-fated city, but even of the whole State of Tennessee. These facts, and others like them, together with general views on the whole subject, lead to a clear and decided judgment on my part that the National Board of Health should be continued with largely increased authority and means of usefulness.

It should seem evident that if ever the sanitarians of this country are to prevent the importation of infectious and contagious diseases, or to arrest their spread, and to control their virulence when they have developed in any locality, it must be done through some such organization. It needs an executive body clothed with national power to establish general quarantine, and to ordain rules and regulations for our sea-ports and rivers. Only thus can quarantine be made effective for the whole country. Only thus can our ports and rivers be made secure against the ingress and spread of such diseases.

For example: who but the General Government has authority to establish simultaneous quarantine at Boston, New York, Baltimore, Norfolk, Savannah, and New Orleans, with all interjacent ports? And if one of the radiating centres of commerce and travel be omitted, quarantine may be vain. Who but the General Government has at once power to establish and money to maintain quarantine at the mouth of the Mississippi River? And how can the General Government act except through some such body as the National Board of Health? And, further: if yellow fever or Asiatic cholera should appear at New Orleans or Memphis, and a steamer were to leave either of these infected ports for the upper rivers, what authority has any State to arrest her progress? True, each State and each municipality may forbid her landing within their limits; but her landing cannot be certainly prevented. She may disregard the law, and risk the consequences. And at best, she can proceed on her way unhindered by any but national authority, putting the whole country in peril as she passes. The General Government can stop all this; can prevent the starting of all such dangerous crafts; or if one should get under way, can arrest her at any point in her course; can seal all exposed ports, and patrol all dangerous rivers. For these, if for no other reasons, we must have a National Board of Health.

But if the fifth resolution mean that the National Board is to regulate and control quarantine between the States and in the towns and cities along our interior thoroughfares, I am decidedly opposed to it. It has been seriously questioned whether the General Government has any such authority. But, admitting for a moment that the authority exists, the exercise of that authority would seem to be highly inexpedient, if not utterly impracticable. I feel quite sure the State and local boards of health can and will manage this part of quarantine better than the National Board. With this exception, I am heartily in favor of the report.

DR. T. A. ATCHISON, of Nashville, said that, in order that silence might not be construed into ingratitude, he would speak a few words, although hoarse. Scarcely had the Tennessee State Board of Health been given the breath of life than it was called into action. The State appropriation was meager, even for a time of peace. Without aid from the National Board of Health they could have done nothing. It was then that the National Board of Health stepped in and helped to protect not only Memphis, but the people outside of that unfortunate city. He was in favor of letting the National Board of Health continue to aid State boards with their wise counsels and means. No reasonable appeal had ever been made to that body that had not been granted. He was in favor of holding up the hands of the National Board in their grand and noble work.

DR. JENNINGS, of Little Rock, said that, in remarks made at the morning session, he had incidentally alluded to the obligations which the State Board of Health of Arkansas were under to the National Board of Health. He now desired to emphasize that matter. Almost immediately on the breaking out of the fever, the State Board found themselves powerless to do anything that would be effective. Application was made to the National Board of Health for help in the emergency, and they promptly gave that help in unstinted measure, which was available in protecting the people of Arkansas from the inroads of fever from the city of Memphis. Had it not been for such help in time of need, the State Board of Health would not have been able successfully to combat the approach of the fever. He was perfectly satisfied with the action of the National Board of Health, and was willing to leave the whole matter of direction in their hands. They had helped his people once, and would help them again, if necessary. He was not particular to inquire minutely into the *how* of the propagation of fever — the questions whether it was carried by persons, baggage, or freights. What he did care for was to keep the enemy from coming within their borders at all.

DR. AZEL AMES, of Massachusetts, said that the warm language of eulogy which he had just heard accorded to the National Board was not more than it deserved. When you contemplated its work, its opportunities, its means and contracted powers, and the brief space of its existence, surely no word of praise had transcended the truth and the merits of the case. He drew a parallel between our National Board of Health and the corresponding body of Great Britain, and in the contrast, reflecting how many years of assiduous labor and trouble the latter had encountered before reaching its present status and the progress made by their own National Board, he saw everything that was encouraging. For himself he had the warmest interest in scientific research. He was sure, under the care of the National Board, the health of the country would be looked after, impartial of section. He hoped that the matter of yellow fever inquiry, already begun, would continue to be diligently prosecuted; that a like manner of investigation be pushed forward in the North as regards typhoid fever and diphtheria. He hoped the time would shortly come when the Board, buoyed by the sympathy and encouragement of the people, would obtain also the fullest exercise of power and means from the National Government for the carrying out of its noble mission.

In supporting these resolutions — and he regarded them as wise and timely — he would say for the National Board, " God speed you."

The President said the resolutions were now before the Association for action.

DR. PINKNEY THOMPSON moved their adoption, and this was carried without opposition. In the fifth resolution the words "national quarantine" were stricken out, and "the execution of the quarantine laws of the United States" substituted.

A NON-INTERCOURSE QUARANTINE.

DR. CHOPPIN (President Cabell having resumed the chair) offered the following resolution: —

Resolved, That a committee on quarantine be appointed by the American Public Health Association, whose duty it shall be to formulate a system of quarantine with such rigor and precision as to prevent the importation of the specific cause of yellow fever.

Dr. Choppin said that by a non-intercourse quarantine he meant the detention of vessels at quarantine station, disinfection, separation of the sick from the well. The value of commerce with the ports from which fever was imported was much less than supposed — probably $500,000 to New Orleans — yet the loss by the results of the importation of two cases in 1878 were not less than $12,000,000, and for the country over $175,000,000. There was great hope for utterly stamping out the disease in Memphis and New Orleans by rigid quarantine and the prevention of any further introduction of the poison.

DR. A. N. BELL, of New York, opposed the resolution, because shutting out ships would perpetuate disease, as ships excluded from port, and not being required to cleanse, would continue to retain infection and transport it from place to place, the while acting upon unfortunate crews and passengers. We should not shrink from the duty of taking hold of filthy and infected vessels, and putting an end to the infection before allowing them to proceed in any instance.

DR. J. P. DAKE, of Nashville, opposed the resolution, because the National Board of Health had this question under consideration, and the resolution was unnecessary.

DR. ELLIOTT, of Savannah, declared himself to be an advocate of a strict quarantine, but was not in favor of stopping commercial intercourse with the West Indies for six months in the year. He believed such a course to be unnecessary. Will it not answer every purpose to stop the ship at quarantine, discharge the cargo, and thoroughly disinfect the vessel itself? Let this method have a fair trial before proceeding to declare non-intercourse. If that plan is thought to be unsafe, the vessel might be unloaded at quarantine, discharging cargo into lighters, then loaded in the same manner and sent away without coming up to the city at all. At least, let this plan be thoroughly tried before proceeding to such extreme measures as interrupting commerce and declaring absolute non-intercourse during the six months of the year when fevers prevail.

DR. LLOYD HOWARD thought there ought to be a difference between quarantine rules for different ports. He did not believe in an absolute non-intercourse quarantine.

DR. CHOPPIN advocated the resolution as necessary.

The reading of the resolution was called for.

DR. A. N. BELL, of New York, opposed the resolution, because shutting off ships would perpetuate disease, as the ships would still retain the infection for years, unless cleansed. We should not be afraid to take hold of the ships and cause the infection to disappear.

DR. S. C. COBB, of Pennsylvania, indorsed Dr. Bell's views.

DR. C. F. FOLSOM, of Massachusetts, called for the question, and the resolution was rejected.

The following resolutions were adopted: —

Resolved, That the replies to schedules under circular 2, of the National Board of Health, be referred to that Board.

Resolved, That this Association, in adopting the recommendation of the President, that the clerical and traveling expenses of the Secretary, necessary to the performance of his duties as Secretary, be paid by the Association, recommend also that he be paid the sum of $100 for the past year's services.

Dr. Early's resolutions, presented at the afternoon session, were tabled, in accordance with the recommendation of the Executive Committee, as were also resolutions by Dr. T. M. Stevens, of Indianapolis, favoring the establishment in each State of hospitals for the treatment of contagious and infectious diseases.

Whereas, It is the belief of the American Public Health Association that a hospital well regulated, with trained nurses, and of capacity sufficient to accommodate all cases of contagious and infectious diseases, would have been a great blessing to many localities during the past few years; and further, that such a hospital, with branches, controlled and supported by the State, such branches situated at points convenient for the reception and treatment of all cases demanding attention at such institution, and especially for cases of contagious and infectious diseases above mentioned, thus rendering easy to reduce to systematic rule the principle of isolation, which is of the greatest importance in staying the progress of such classes of disease; therefore, be it

Resolved, That the American Public Health Association recommend the establishment in every State of the Union of hospitals, controlled and supported by the State, with suitable accommodations attached to each for reception and treatment of contagious and infectious diseases. That such hospital be upon the plan of a central one, with branches placed at convenient points throughout the State, so as to accommodate the sick of the entire State.

Resolved, That a copy of this preamble and resolutions be sent to the secretary of every State Medical Society for presentation to said society, and to the secretary of each State Board of Health and State Health Commission.

The following were also tabled, in accordance with a similar recommendation. By HON. E. A. JAMES, of Chattanooga: —

Resolved, That it is the opinion of this Association that yellow fever can originate in the United States.

By DR. A. N. BELL, of New York: —

Resolved, As the sense of the American Public Health Association, we hail with eminent satisfaction the determination of the people of Memphis to institute forthwith such means of practical sanitation as may be deemed essential for the redemption of that city from yellow fever; and that we will, individually and collectively, exert ourselves in the promotion of the work.

RESOLUTIONS OF THANKS.

DR. JOHN S. BILLINGS said that the work of the present meeting was now drawing to a close. It had been the largest, most satisfactory, and most pleasant meeting he had ever attended. This had been largely due to the efforts of various corporations and individuals in this State and city and elsewhere.

He also offered the following resolutions, which were unanimously adopted: —

Resolved, That the sincere and hearty thanks of this Association are hereby tendered to the following corporations and individuals for valuable services rendered: —

The Nashville, Chattanooga, and St. Louis Railroad Company; the East Tennessee, Virginia, and Georgia Railroad Company; The Louisville and Nashville and Great Southern Railroad Company; the Illinois Central and New Orleans, Chicago, and St. Louis Railroad; the St. Louis and Iron Mountain Railroad, for free passes both ways over their lines to the delegates attending the seventh annual meeting of this Association. To the Central and the Western and Atlantic Railroads, of Georgia; to the Washington City, Midland and Great Southern Railroads; to the Atlantic, Mississippi, and Ohio Railroads; the Memphis and Charleston Railroad; and all roads in Tennessee for half-fare and reduced rates to delegates.

To the General Assembly of the State of Tennessee for the use of commodious rooms in the State Capitol building.

To Maj. John L. Brown, Superintendent of the Capitol, for attention and courtesies.

To the teachers and trustees of the various educational institutions in the vicinity of Nashville.

To Capt. W. Stockell, Chief of the Nashville Fire Department, for invitations.

To Mrs. S. K. Hatton and her accomplished daughter, Miss Emily Hatton, for their unremitting attentions to the visitors to the State Library, in exhibiting and explaining the valuable and interesting collections which are there preserved.

To the Citizens' Auxiliary Sanitary Association of Nashville, for three hundred copies of the third report of the Board of Health of the city of Nashville.

To Mrs. James K. Polk, for her invitation and hospitable reception.

To Dr. John M. Lawrence, for invitation to visit the Hermitage.

To Gens. William Harding and W. H. Jackson, for their entertainment and reception at Belle Meade.

To the Bell Telephone Company.

To the Western Union Telegraph Company, for its liberality in transmitting dispatches for the officers and members of the Association, free of charge.

To the "Daily American" Publishing Company, for full, accurate, and correct reports of the meeting, and for other courtesies extended by them.

To the "Daily Evening Banner," for courtesies and attention shown the members.

To the Local Committee and the citizens of Nashville, for their cordial hospitality and attention to the wants of the members, which has done so much to make this a harmonious and enjoyable meeting.

To Dr. J. Berrien Lindsley, Secretary of the Local Committee, whose laborious services and tireless energy has effected the most successful meeting in the annals of this Association; and to his assistant, Judge Pitkin C. Wright, for his courtesy and attention.

Dr. A. L. Gihon offered the following resolution, which was adopted by a rising vote with hearty applause: —

Resolved, that the American Public Health Association, recognizing the ability and dignity with which its retiring President, Prof. James L. Cabell, of the University of Virginia, has performed the onerous duties of his office, gratefully tender him its thanks for the invaluable service he has rendered it, and the great cause in which it is enlisted, and assures him that he carries with him the respect and affectionate regard of every one of its individual members.

Dr. Hewitt, of Minnesota, offered the following resolution, which was adopted: —

Resolved, that the thanks of the Association be presented to Dr. H. B. Baker, the retiring Treasurer, and that the Secretary be instructed to communicate to him the genuine condolence of its members in his recent bereavement.

President Cabell said that he did not think the preservation of good order was at all due to him, but to the uniform good conduct of the members. He thanked them kindly, and then declared the Association adjourned.

LIST OF MEMBERS ELECTED AT THE SEVENTH ANNUAL MEETING.

A. G. Adams, Nashville, Tenn.
Nathan Adams, Nashville, Tenn.
C. H. Alden, M. D., U. S. A., New York, N. Y.
N. E. Alloway, Nashville, Tenn.
J. D. Anderson, Nashville, Tenn.
William A. Atchison, M. D., Nashville, Tenn.
George F. Babbitt, Boston, Mass.
Dr. William Bailey, Louisville, Ky.
Dr. G. W. Barr.
Dr. W. F. Barr, Abingdon, Va.
Dr. J. H. Bartholomew, Lansing, Mich.
John M. Bass, Nashville, Tenn.
Dr. H. W. Bassett, Huntsville, Ala.
Dr. G. A. Baxter, Chattanooga, Tenn.
Jeremiah Baxter, Nashville, Tenn.
Dr. Montgomery Baxter, Nashville, Tenn.
Dr. Thomas J. Bennett, Smyrna, Tenn.
C. D. Berry, Nashville, Tenn.
Dr. George S. Blackie, Nashville, Tenn.
Dr. J. C. Blanton, New Market, Ala.
Dr. John M. Bloss, Evansville, Ind.
Dr. William P. Brewer, New Orleans, La.
Dr. A. L. Breysacher, Little Rock, Ark.
Hon. William G. Brien, Nashville, Tenn.
Maj. John L. Brown, Nashville, Tenn.
Hon. W. Matt Brown, Nashville, Tenn.
Hon. M. T. Bryan, Nashville, Tenn.
H. B. Buckner, Nashville, Tenn.
Dr. John R. Buist, Nashville, Tenn.
Dr. J. S. Buist, Charleston, S. C.
Dr. John H. Callender, Nashville, Tenn.
Thomas Callender, Nashville, Tenn.
Col. John F. Cameron, Memphis, Tenn.
Henry Fraser Campbell, M. D., Augusta, Ga.
Dr. W. A. Cantrell, Little Rock, Ark.
H. P. Cartwright, Rich Pond, Ky.
Richard Cheatham, M. D., Nashville, Tenn.
Rev. J. B. Chevis, D. D., Forrest City, Ark.
Dr. W. M. Clark, Nashville, Tenn.
Eliot C. Clarke, Boston, Mass.
Dr. H. H. Clayton, Murfreesborough, Tenn.
Hon. S. C. Cobb, Pensacola, Fla.
Dr. Bela Coggshall, Flint, Mich.
E. W. Cole, Nashville, Tenn.
Dr. S. H. Collins, Memphis, Tenn.
Hon. A. S. Colyar, Nashville, Tenn.
Dr. J. W. Compton, Evansville, Ind.
W. C. Cook, M. D., Nashville, Tenn.
Hon. W. F. Cooper, Nashville, Tenn.
R. S. Cowan, Nashville, Tenn.
Thomas D. Craighead, Nashville, Tenn.
S. A. Cunningham, Cartersville, Ga.
Dr. J. P. Dake, Nashville, Tenn.
Dr. J. P. Davidson, New Orleans, La.
J. W. Davis, M. D., Smyrna, Tenn.
B. J. Day, Evansville, Ind.
Dr. T. R. Deason, Trenton, Tenn.
Dr. R. W. Dorsey, Fairfax C. H., Va.
E. L. Drake, M. D., Nashville, Tenn.
Dr. John A. Draughon, Nashville, Tenn.
R. W. Dunlap, M. D., Danville, Ky.
Dr. O. R. Early, Columbus, Ky.
Dr. A. A. East, Nashville, Tenn.
Dr. Alexander Erskine, Memphis, Tenn.
A. J. Erwin, Mansfield, Ohio.
R. F. Evans, M. D., Shelbyville, Tenn.
Duncan Eve, M. D., Nashville, Tenn.
J. Horton Fall, Nashville, Tenn.
Edward Fenner, New Orleans, La.
C. C. Fite, M. D., Shelbyville, Tenn.
Dr. T. L. Fite, Lebanon, Tenn.
Thomas D. Fite, Nashville, Tenn.
Wilbur F. Foster, C. E., Nashville, Tenn.
E. W. Franklin, Mitchellville, Tenn.
Dr. H. D. Fraser, Charleston, S. C.
Dr. R. W. Gaines, Hopkinsville, Ky.
Dr. W. H. Galt, Louisville, Ky.
Dr. J. D. Gatch, Lawrenceburg, Ind.
Dr. B. F. Gibbs, U. S. N., Washington, D. C.
Dr. William F. Glenn, Nashville, Tenn.
W. A. Goodwyn, Nashville, Tenn.
Dr. J. F. Grant, Nashville, Tenn.
Dr. E. H. Green, U. S. Navy, Annapolis, Md.
Rev. William Green, Nashville, Tenn.
Dr. W. E. Griffiths, Brooklyn, N. Y.
Dr. W. D. Haggard, Nashville, Tenn.
Dr. R. A. Hardin, Savannah, Tenn.
Dr. J. M. Harding, Nashville, Tenn.
Dr. R. B. S. Hargis, Pensacola, Fla.

Dr. J. E. Harris, Nashville, Tenn.
Dr. J. R. Harwell, Nashville, Tenn.
Dr. S. V. D. Hill, Macon, Miss.
R. S. Hollins, Nashville, Tenn.
Dr. George Homan, St. Louis, Mo.
Hon. M. B. Howell, Nashville, Tenn.
Dr. J. A. Ireland, Louisville, Ky.
Hon. E. A. James, Chattanooga, Tenn.
Dr. R. G. Jennings, Little Rock, Ark.
R. W. Jennings, Nashville, Tenn.
C. A. Johns, Chemist, New York, N. Y.
Hon. John Johnson, Memphis, Tenn.
Dr. Alfred Jones, Cornersville, Tenn.
Dr. H. G. Jones, Evansville, Ind.
Dr. W. P. Jones, Nashville, Tenn.
G. Jordan, V. P. Texas Central R. R., Houston, Texas.
Dr. Robert C. Kedzie, Lansing, Mich.
James M. Keith, Boston, Mass.
Dr. J. M. Keller, Hot Springs, Ark.
Hon. T. A. Kercheval, Nashville, Tenn.
Dr. R. F. Keyes, Nashville, Tenn.
Hon. John M. Lea, Nashville, Tenn.
Dr. J. C. LeHardy, Savannah, Ga.
Hon. John Lellyett, Nashville, Tenn.
Dr. B. B. Lenoir, Lenoir's, Tenn.
Dr. A. D. Lewis, La Grange, Tenn.
Dr. C. L. Lewis, Nashville, Tenn.
William B. Lillard, Detroit, Mich.
J. McGavock Lindsley, Nashville, Tenn.
Dr. Van S. Lindsley, Nashville, Tenn.
Dr. Isaac N. Love, St. Louis, Mo.
N. T. Lupton, LL.D., Nashville, Tenn.
A. Hume Lusk, Nashville, Tenn.
M. A. McClelland, Knoxville, Tenn.
John J. McGavock, Nashville, Tenn.
J. P. McGuire, Nashville, Tenn.
C. W. McLester, Nashville, Tenn.
Hon. Albert T. McNeal, Bolivar, Tenn.
Bishop H. N. McTyeire, Nashville, Tenn.
Dr. T. L. Maddin, Nashville, Tenn.
Hon. Thomas H. Malone, Nashville, Tenn.
Dr. R. B. Maury, Memphis, Tenn.
Dr. O. H. Menees, Nashville, Tenn.
Dr. Thomas Menees, Nashville, Tenn.
Dr. W. D. Middleton, Davenport, Iowa.
Dr. E. R. Montgomery, Louisville, Ky.
Hon. K. J. Morris, Nashville, Tenn.
R. L. Morris, Nashville, Tenn.
Dr. Ambrose Morrison, Nashville, Tenn.
Dr. William Morrow, Nashville, Tenn.
Dr. H. A. Moseley, Wartrace, Tenn.
Gen. R. P. Neely, Bolivar, Tenn.
W. C. Nelson, Nashville, Tenn.
Dr. L. H. A. Nickerson, Quincy, Ill.
Dr. John N. Niglas, Peoria, Ill.
Dr. J. B. W. Nowlin, Nashville, Tenn.
J. B. O'Bryan, Nashville, Tenn.
Michael J. O'Shaughnessy, Nashville, Tenn.
Dr. A. Otterson, Brooklyn, N. Y.
H. E. Pendleton, Nashville, Tenn.
Dr. J. W. Penn, Humboldt, Tenn.
Hon. S. F. Phillips, Washington, D. C., Solicitor-general, Member of National Board of Health.
Ed. H. Pigue, Nashville, Tenn.
M. B. Pilcher, Nashville, Tenn.
Dr. F. E. Pope, Little Rock, Ark.
John H. Pope, Little Rock, Ark.
Hon. D. T. Porter, Memphis, Tenn.
William Porter, Nashville, Tenn.
Dr. Thomas K. Powell, Dancyville, Tenn.
Dr. H. W. Purnell, Memphis, Tenn.
D. P. Rankin, Nashville, Tenn.
George E. Redwood, Meridian, Miss.
Dr. J. C. Roberts, Pulaski, Tenn.
Dr. W. B. Rodman, Frankfort, Ky.
Dr. R. G. Rothrock, Nashville, Tenn.
Dr. R. Rutherford, Houston, Texas.
Dr. L. C. Rynchean, Huntsville, Ala.
Dr. J. M. Safford, Nashville, Tenn.
L. F. Salomon, New Orleans, La.
Dr. D. D. Saunders, Memphis, Tenn.
N. J. Sawyier, Frankfort, Ky.
Dr. J. E. D. Scott, Humboldt, Tenn.
Dr. W. R. Sevier, Jonesborough, Tenn.
Dr. E. H. Skipwith, Little Rock, Ark.
Dr. William A. Smith, Columbia, Tenn.
William C. Smith, Architect, Nashville, Tenn.
Dr. R. D. Starkweather, Chicago, Ill.
Eben S. Stearns, D. D., Nashville, Tenn.
Dr. R. W. Steger, Nashville, Tenn.
Dr. James B. Stephens, Nashville, Tenn.
Dr. J. Bunyan Stephens, Nashville, Tenn.
Dr. J. K. Stephens, Ralston, Tenn.
Dr. W. H. Stetwell, Humboldt, Tenn.
Dr. Thomas O. Summers, Nashville, Tenn.
Dr. T. H. Swaim, Gleason, Tenn.
William D. Talbot, Nashville, Tenn.
Dr. F. L. Taney, New Orleans, La.
Albert B. Tavel, Nashville, Tenn.
John J. Taylor, Jackson, Tenn.
Dr. W. W. Taylor, Brownsville, Tenn.
Dr. R. C. Thomas, Bowling Green, Ky.
Rev. Hugh Miller Thompson, D. D., New Orleans, La.
Dr. Pinckney Thompson, Henderson, Ky.
Dr. G. B. Thornton, Memphis, Tenn.
Dr. Joseph M. Towler, Columbia, Tenn.
Dr. Smith Townshend, Washington, D. C.

Dr. N. G. Tucker, Nashville, Tenn.
Dr. T. J. Tyner, Memphis, Tenn.
James C. Warner, Nashville, Tenn.
J. H. Washington, Murfreesborough, Tenn.
Dr. A. P. Waterfield, McKenzie, Tenn.
Samuel Watkins, Nashville, Tenn.
Dr. W. F. Westmoreland, Atlanta, Ga.
J. P. White, Nashville, Tenn.
Dr. R. C. White, Morgan City, La.
Dr. William White, Franklin, Tenn.
Dr. E. M. Wight, Chattanooga, Tenn.
Dr. O. W. Wight, Milwaukee, Wis.
Gen. J. T. Wilder, Chattanooga, Tenn.
Prof. T. P. Wilson, Cincinnati, Ohio.
Dr. W. B. Winn, Memphis, Tenn.
Dr. Julius Wise, Memphis, Tenn.
William Woodfolk, Nashville, Tenn.
Dr. Horatio P. Wright, North Evanston, Ill.
Dr. John Wright, Panola, Miss.
Hon. Pitkin C. Wright, Nashville, Tenn.

APPENDIX.

LIST OF MEMBERS OF THE ASSOCIATION.

		ELECTED.
A. G. Adams	Nashville, Tenn.	1879.
Dr. Daniel W. Adams	New Orleans, La.	1878.
Nathan Adams	Nashville, Tenn.	1879.
Dr. C. R. Agnew	New York, N. Y.	1872.
Dr. C. H. Alden, U. S. A.	New York, N. Y.	1879.
Geo. W. Allen	Richmond, Va.	1878.
Dr. J. Adams Allen	Chicago, Ill.	1876.
Dr. Nathan Allen	Lowell, Mass.	1873.
N. E. Alloway	Nashville, Tenn.	1879.
Dr. Azel Ames, Jr.	Wakefield, Mass.	1875.
John D. Anderson	Nashville, Tenn.	1879.
Dr. Geo. L. Andrew	La Porte, Ind.	1877.
Dr. Edmund Andrews	Chicago, Ill.	1876.
Dr. E. C. Angell	New York, N. Y.	1878.
Geo. T. Angell	Boston, Mass.	1878.
Elliott Anthony	Chicago, Ill.	1876.
Rev. J. G. Armstrong	Richmond, Va.	1878.
Dr. W. J. Arsdale	Pittsburgh, Pa.	1875.
Dr. T. A. Atchison, Mem. State Board of Health	Nashville, Tenn.	1878.
Dr. W. A. Atchison	Nashville, Tenn.	1879.
Dr. Chas. Aurbrook	Boulder, Col.	1878.
Dr. W. G. Austin	New Orleans, La.	1878.
Geo. F. Babbitt, Health Commissioner	Boston, Mass.	1879.
Dr. Francis Bacon	New Haven, Conn.	1872.
Dr. Wm. Bailey	Louisville, Ky.	1879.
Dr. P. H. Bailhache, U. S. M. H. S., Member of National Board of Health	Washington, D. C.	1874.
Dr. Henry B. Baker, Sec. State Board of Health	Lansing, Mich.	1873.
Dr. G. B. Balch	Yonkers, N. Y.	1874.
Dr. M. C. Baldridge, Sec. State Board of Health	Huntsville, Ala.	1878.
F. A. P. Barnard, LL. D., Pres. of Columbia College,	New York, N. Y.	1873.
Gen. Joseph K. Barnes, M. D., Surg. Gen. U. S. A.,	Washington, D. C.	1874.
Dr. G. W. Barr		1879.
Dr. W. F. Barr	Abingdon, Va.	1879.
Dr. J. H. Bartholomew	Lansing, Mich.	1879.
John M. Bass	Nashville, Tenn.	1879.
Dr. H. W. Bassett	Huntsville, Ala.	1879.
Dr. G. A. Baxter	Chattanooga, Tenn.	1879.
Jere. Baxter	Nashville, Tenn.	1879.
Dr. J. H. Baxter	Washington, D. C.	1876.

Dr. Montgomery Baxter	Nashville, Tenn.	1879.
Dr. W. H. Beatty	Mobile, Ala.	1878.
Dr. A. N. Bell	Garden City, N. Y.	1872.
Prof. S. M. Bemiss, M. D., Member National Board of Health	New Orleans, La.	1878.
Dr. Thos. J. Bennett	Smyrna, Tenn.	1879.
C. D. Berry	Nashville, Tenn.	1879.
Dr. John S. Billings, U. S. A., Vice-President National Board of Health	Washington, D. C.	1872.
Dr. John E. Bingham	Walla Walla, W. T.	1878.
Gen. Jas. Bintliff, Mem. State Board of Health	Darlington, Wis.	1878.
Dr. Geo. S. Blackie	Nashville, Tenn.	1879.
Dr. Emily Blackwell	New York, N. Y.	1873.
J. C. Blanton, M. D.	New Market, Ala.	1879.
E. W. Blatchford	Chicago, Ill.	1876.
Dr. John M. Bloss, Supt. Pub. Schools	Evansville, Ind.	1879.
Dr. J. L. Bodine	Trenton, N. J.	1877.
Dr. Henry I. Bowditch, Pres. State Board of Health	Boston, Mass.	1876.
Dr. H. P. Bowditch	Boston, Mass.	1875.
Dr. William R. Bowling	Nashville, Tenn.	1874.
Prof. Cyrus F. Brackett	Princeton, N. J.	1877.
Prof. Wm. H. Brewer, State Board of Health	New Haven, Conn.	1874.
Dr. W. P. Brewer	New Orleans, La.	1879.
Dr. A. L. Breysacher, State Board of Health	Little Rock, Ark.	1879.
Hon. Wm. G. Brien	Nashville, Tenn.	1879.
Dr. Wm. Brodie	Detroit, Mich.	1873.
Hon. F. J. Bromberg	Mobile, Ala.	1878.
Dr. Harvey E. Brown	Key West, Fla.	1873.
Maj. John L. Brown	Nashville, Tenn.	1879.
Dr. Valentine Brown	Yonkers, N. Y.	1879.
Hon. W. Matt Brown	Nashville, Tenn.	1879.
J. Brush, C. E.	Hoboken, N. J.	1879.
Dr. J. Mortimer Brush, Health Officer	Bayonne, N. J.	1879.
Hon. M. T. Bryan	Nashville, Tenn.	1879.
H. B. Buckner	Nashville, Tenn.	1879.
Dr. John R. Buist, Pres. Board of Health	Nashville, Tenn.	1879.
Dr. J. S. Buist, Member Board of Health	Charleston, S. C.	1879.
Dr. Samuel C. Busey	Washington, D. C.	1873.
Dr. L. P. Bush, Sec. State Board of Health	Wilmington, Del.	1879.
Dr. J. Grattan Cabell, Health Officer	Richmond, Va.	1873.
Prof. J. L. Cabell, M. D., President National Board of Health	Charlottesville, Va.	1872.
Dr. John H. Callender	Nashville, Tenn.	1879.
Thomas Callender	Nashville, Tenn.	1879.
Alex. Cameron	Richmond, Va.	1878.
Col. John F. Cameron	Memphis, Tenn.	1879.
Prof. Henry F. Campbell, M. D.	Augusta, Ga.	1879.
Judge J. V. Campbell	Detroit, Mich.	1875.
Dr. W. A. Cantrell	Little Rock, Ark.	1879.
J. L. Carrington	Richmond, Va.	1878.
Dr. Paul S. Carrington	Quarantine Station, Mississippi River.	1878.
Dr. H. P. Cartwright	Rich Pond, Ky.	1879.

Prof. Stanford E. Chaillé, M. D.	New Orleans, La.	1874.
Dr. C. W. Chamberlain	Hartford, Conn.	1878.
Dr. W. M. Chambers	Charleston, Ill.	1877.
Dr. C. W. Chancellor	Baltimore, Md.	1875.
Prof. C. F. Chandler, Pres. Board of Health	New York, N. Y.	1872.
Dr. Wm. F. Channing	Providence, R. I.	1876.
Dr. Richard Cheatham, Sec. Board of Health	Nashville, Tenn.	1879.
E. S. Cheesbrough, C. E.	Chicago, Ill.	1875.
Rev. J. B. Chevis, D. D.	Nashville, Tenn.	1879.
Dr. Samuel Choppin,[1] Pres. State Board of Health	New Orleans, La.	1874.
Prof. Geo. Churchill, C. E.	Galesburg, Ill.	1877.
Hon. J. W. Clapp	Memphis, Tenn.	1879.
Dr. Anson L. Clark	Elgin, Ill.	1877.
Dr. D. L. Clark	Rockford, Ill.	1877.
D. S. Clark		1877.
Dr. Lucius D. Clark	Rockford, Ill.	1877.
Dr. Wm. M. Clark, Sec. State Board of Health	Nashville, Tenn.	1879.
Eliot C. Clarke	Boston, Mass.	1879.
Prof. E. W. Claypole	Yellow Springs, Ohio.	1875.
Dr. H. H. Clayton	Murfreesborough, Tenn.	1879.
Dr. B. A. Clements	St. Louis, Mo.	1874.
Dr. Wm. Clendenin	Cincinnati, Ohio.	1872.
Hon. S. C. Cobb	Boston, Mass.	1875.
Hon. S. C. Cobb	Pensacola, Fla.	1879.
Dr. Jerome Cochran, Health Officer of Alabama	Mobile, Ala.	1872.
Dr. Bela Coggshall	Flint, Mich.	1879.
Dr. L. H. Cohen	Quincy, Ill.	1877.
E. W. Cole, Mem. State Board of Health	Nashville, Tenn.	1879.
Dr. S. H. Collins	Memphis, Tenn.	1879.
Hon. A. S. Colyar	Nashville, Tenn.	1879.
Dr. J. W. Compton	Evansville, Ind.	1879.
Dr. J. P. Conn	Concord, N. H.	1875.
Dr. J. S. Conrad	Baltimore, Md.	1875.
Prof. Geo. H. Cook	New Brunswick, N. J.	1874.
Dr. W. C. Cook	Nashville, Tenn.	1879.
Hon. W. F. Cooper	Nashville, Tenn.	1879.
Dr. J. S. Copes	New Orleans, La.	1878.
R. S. Cowan	Nashville, Tenn.	1879.
Thos. D. Craighead	Nashville, Tenn.	1879.
Dr. Chas. H. Crane, Assist. Surg. Gen., U. S. A.	Washington, D. C.	1874.
Dr. James Crane, Pres. Board of Health	Brooklyn, N. Y.	1877.
J. James R. Croes, C. E.	Yonkers, N. Y.	1877.
Henry G. Crowell	Boston, Mass.	1875.
James Cruikshank, LL. D.	New York, N. Y.	1874.
Prof. Francis D. Cunningham, M. D.	Richmond, Va.	1876.
S. A. Cunningham	Cartersville, Ga.	1879.
Dr. Josiah Curtis	Washington, D. C.	1874.
Gen. John M. Cuyler, M. D., Med. Dir. U. S. A.	New York, N. Y.	1873.
Dr. Jacob M. Da Costa	Philadelphia, Pa.	1874.
Dr. J. P. Dake	Nashville, Tenn.	1879.
Dr. Jas. G. Darrach	Germantown, Pa.	1874.

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[1] Deceased 1880.

Dr. J. P. Davidson	New Orleans, La.	1879.
Dr. Francis Davis	Chicago, Ill.	1877.
Joseph P. Davis, C. E.	Boston, Mass.	1876.
Prof. J. S. Davis, M. D.	University of Va.	1878.
Dr. J. W. Davis	Smyrna, Tenn.	1879.
Dr. M. M. Davis	Baraboo, Wis.	1877.
Prof. N. S. Davis, M. D.	Chicago, Ill.	1873.
Dr. J. B. Davison	Moline, Ill.	1877.
B. J. Day	Evansville, Ind.	1879.
Dr. Walter De Forest Day, Sanitary Superintendent	New York, N. Y.	1873.
T. R. Deason	Trenton, Tenn.	1879.
Dr. J. J. Dement, Pres. State Board of Health	Huntsville, Ala.	1878.
Dr. Laban Dennis, Member State Board of Health	Newark, N. J.	1877.
Wm. E. Dodge, Jr.	New York, N. Y.	1874.
Prof. Frank Donaldson	Baltimore, Md.	1875.
Dr. R. W. Dorsey	Fairfax C. H., Va.	1879.
Dr. Greensville Dowell	Galveston, Tex.	1878.
Hon. Thos. A. Doyle, Mayor	Providence, R. I.	1875.
Dr. E. L. Drake	Nashville, Tenn.	1879.
Dr. F. W. Draper	Boston, Mass.	1875.
Dr. John A. Draughon, Mem. Board of Health	Nashville, Tenn.	1879.
Dr. Abram Dubois	New York, N. Y.	1874.
R. L. Dugdale	New York, N. Y.	1876.
Dr. R. W. Dunlap, State Board of Health	Danville, Ky.	1879.
Dr. D. H. Dungan	Little Rock, Ark.	1874.
Dr. T. J. Dunott	Harrisburg, Pa.	1874.
Dr. S. H. Durgin, Health Officer	Boston, Mass.	1875.
Dr. O. R. Early	Columbus, Ky.	1879.
Dr. A. A. East	Nashville, Tenn.	1879.
D. B. Eaton, LL. D.	New York, N. Y.	1872.
Hon. John Eaton, Commissioner of Education	Washington, D. C.	1874.
Dr. Landon B. Edwards	Richmond, Va.	1878.
Dr. James H. Eldridge	East Greenwich, R. I.	1873.
Dr. C. N. Ellingwood	San Francisco, Cal.	1872.
Prof. E. B. Elliott	Washington, D. C.	1875.
Dr. Wm. H. Elliott	Savannah, Ga.	1878.
Dr. Louis Elsberg	New York, N. Y.	1874.
Dr. F. A. Emmons	Chicago, Ill.	1877.
Dr. George Engs	Newport, R. I.	1876.
Dr. Alexander Erskine	Memphis, Tenn.	1879.
A. J. Erwin	Mansfield, Ohio.	1879.
Dr. R. F. Evans	Shelbyville, Tenn.	1879.
Dr. Duncan Eve	Nashville, Tenn.	1879.
C. E. Fairbank	Chicago, Ill.	1876.
J. Horton Fall	Nashville, Tenn.	1879.
Dr. A. M. Fauntleroy	Staunton, Va.	1878.
Dr. John Faville, State Board of Health	Madison, Wis.	1876.
Charles E. Felton	Chicago, Ill.	1876.
Edward Fenner, V. P. Sanitary Association	New Orleans, La.	1879.
Dr. Emil Fischer	Philadelphia, Pa.	1874.
L. C. Fisher	Galveston, Tex.	1878.

Dr. C. C. Fite, President Board of Health	Shelbyville, Tenn.	1879.
Thos. D. Fite	Nashville, Tenn.	1879.
Dr. T. L. Fite	Lebanon, Tenn.	1879.
Prof. Austin Flint, M. D.	New York, N. Y.	1873.
Dr. Chas. F. Folsom, Sec. State Board of Health	Boston, Mass.	1874.
Dr. G. W. Foote	Galesburg, Ill.	1877.
Prof. Corydon La Ford, M. D.	Ann Arbor, Mich.	1877.
Dr. Wm. H. Ford	Philadelphia, Pa.	1874.
Wilbur F. Foster, C. E.	Nashville, Tenn.	1879.
E. W. Franklin	Mitchellville, Tenn.	1879.
Dr. H. D. Fraser, Secretary State Board of Health	Charleston, S. C.	1879.
Dr. Geo. F. French	Minneapolis, Minn.	1875.
Dr. B. E. Fryer	New York, N. Y.	1873.
Dr. R. W. Gaines	Hopkinsville, Ky.	1879.
Dr. J. D. Galt	Norfolk, Va.	1878.
Dr. W. H. Galt	Louisville, Ky.	1879.
Prof. James T. Gardner, State Survey	Albany, N. Y.	1875.
Dr. John B. Gaston	Montgomery, Ala.	1878.
Dr. J. D. Gatch	Lawrenceburg, Ind.	1879.
Dr. Henry Gibbons, Jr.	San Francisco, Cal.	1873.
Dr. B. F. Gibbs, U. S. N.	Washington, D. C.	1879.
Prof. Wolcott Gibbs	Cambridge, Mass.	1876.
Dr. A. L. Gihon, U. S. N.	Washington, D. C.	1876.
Prof. Daniel C. Gilman	Baltimore, Md.	1873.
Dr. John T. Gilman	Portland, Me.	1873.
Dr. J. H. Gilmore	New York, N. Y.	1878.
Dr. Alfred C. Girard	Fort Keogh, Mon. Ter.	1874.
Dr. Wm. C. W. Glazier, U. S. M. H. S.	Key West, Fla.	1878.
Dr. W. Gleitsman	Asheville, N. C.	1875.
Dr. Wm. F. Glenn	Nashville, Tenn.	1879.
Dr. H. Earnest Goodman	Philadelphia, Pa.	1874.
W. A. Goodwyn	Nashville, Tenn.	1879.
Dr. Gabriel Grant	New York, N. Y.	1873.
Dr. J. F. Grant	Nashville, Tenn.	1879.
Crosby Gray	Pittsburgh, Pa.	1874.
Dr. E. W. Gray	Bloomington, Ill.	1877.
Dr. John P. Gray	Utica, N. Y.	1873.
Dr. E. H. Green, U. S. N.	Annapolis, Md.	1879.
Rev. Wm. Green	Nashville, Tenn.	1879.
J. M. Gregory, LL. D., Mem. State Board of Health	Champaign, Ill.	1877.
Dr. E. L. Griffin, Mem. State Board of Health	Fond du Lac, Wis.	1876.
Dr. W. E. Griffiths	Brooklyn, N. Y.	1879.
Prof. S. D. Gross, M. D., D. C. L.	Philadelphia, Pa.	1874.
Dr. John Guerin	Chicago, Ill.	1876.
Dr. Desault Guernsey	Amenia, N. Y.	1873.
Dr. N. L. Guice	Fayette, Miss.	1878.
Dr. Richard Gundry	Catonsville, Md.	1878.
Dr. J. C. Habersham	Savannah, Ga.	1878.
Dr. W. D. Haggard	Nashville, Tenn.	1879.
Dr. R. C. Hamil	Chicago, Ill.	1876.
Dr. John B. Hamilton, U. S. M. H. S.	Washington, D. C.	1878.
Dr. D. W. Hand	St. Paul, Minn.	1878.

Col. T. S. Hardee, C. E.	New Orleans, La.	1878.
R. A. Hardin	Savannah, Tenn.	1879.
Dr. J. M. Harding	Nashville, Tenn.	1879.
Dr. R. B. S. Hargis	Pensacola, Fla.	1878.
Dr. Elisha Harris	New York, N. Y.	1872.
Dr. J. E. Harris	Nashville, Tenn.	1879.
Prof. J. F. Harrison	University of Virginia, Va.	1878.
Dr. Edward Hartshorne	Philadelphia, Pa.	1874.
Dr. Henry Hartshorne	Philadelphia, Pa.	1872.
Dr. D. J. Hartsook	Richmond, Va.	1878.
Dr. J. R. Harwell	Nashville, Tenn.	1879.
Dr. Thos. Hay	Philadelphia, Pa.	1874.
Dr. John T. Head	St. Paul, Minn.	1873.
Rudolph Hering, C. E.	Philadelphia, Pa.	1878.
Dr. S. S. Herrick	New Orleans, La.	1878.
Hon. Abram S. Hewitt	New York, N. Y.	1874.
Dr. C. N. Hewitt	Red Wing, Minn.	1872.
Dr. Addinell Hewson	Philadelphia, Pa.	1874.
Dr. E. A. Hildreth	Wheeling, W. Va.	1874.
Dr. S. V. D. Hill	Macon, Miss.	1879.
Prof. Edward Hitchcock	Amherst, Mass.	1877.
Dr. H. O. Hitchcock, Mem. State Board of Health	Kalamazoo, Mich.	1872.
Dr. J. W. Holland, Mem. State Board of Health	Louisville, Ky.	1879.
Dr. D. C. Holliday	New Orleans, La.	1878.
R. S. Hollins	Nashville, Tenn.	1879.
Dr. J. H. Hollister	Chicago, Ill.	1877.
Dr. Henry D. Holton	Brattleborough, Vt.	1875.
Dr. George Homan, Sec. Board of Health	St. Louis, Mo.	1879.
Dr. W. T. Hope	Chattanooga, Tenn.	1878.
Dr. A. A. Horner, San. Ins. Nat. Board of Health	Helena, Ark.	1879.
Dr. Asa Horr	Dubuque, Iowa.	1873.
Dr. Samuel Houston, U. S. M. H. S.		1873.
Dr. E. Lloyd Howard	Baltimore, Md.	1874.
Hon. M. B. Howell	Nashville, Tenn.	1879.
H. M. Hoxie, Supt. International R. R.	Palestine, Texas.	1879.
Dr. Van Buren Hubbard, U. S. A.		1874.
Dr. Ezra M. Hunt, Sec. State Board of Health	Metuchen, N. J.	1872.
Dr. Sanford B. Hunt	Newark. N. J.	1874.
Dr. N. C. Husted	New York, N. Y.	1873.
Dr. Joseph C. Hutchinson	Brooklyn, N. Y.	1873.
Dr. O. S. Iglehart	Vicksburg, Miss.	1878.
Dr. E. Ingals	Chicago, Ill.	1877.
Dr. J. A. Ireland	Louisville, Ky.	1879.
Dr. Bushrod W. James	Philadelphia, Pa.	1878.
Hon. E. A. James	Chattanooga, Tenn.	1879.
Dr. Ed. H. Janes, Assistant Sanitary Superintendent,	New York, N. Y.	1872.
Dr. Edward G. Janeway, Board of Health	New York, N. Y.	1875.
Dr. J. Foster Jenkins	Yonkers, N. Y.	1875.
Dr. R. G. Jennings	Little Rock, Ark.	1879.
R. W. Jennings	Nashville, Tenn.	1879.
Dr. S. L. Jepson	Wheeling, W. Va.	1875.
C. A. Johns, Chemist	New York, N. Y.	1879.

Dr. Hosmer A. Johnson, Mem. of the Nat. Board of Health	Chicago, Ill.	1872.
Hon. John Johnson, State Board of Health	Memphis, Tenn.	1879.
Reverdy Johnson	Baltimore, Md.	1875.
Dr. Wirt Johnston, State Board of Health	Jackson, Miss.	1878.
Dr. Alfred Jones	Cornersville, Tenn.	1879.
Dr. Heber Jones	Memphis, Tenn.	1878.
Dr. H. G. Jones	Evansville, Ind.	1879.
Dr. W. P. Jones	Nashville, Tenn.	1879.
G. Jordan, V. P. Texas Central R. R.	Houston, Tex.	1879.
Dr. L. S. Joynes	Richmond, Va.	1878.
Dr. A. B. Judson	New York, N. Y.	1873.
Prof. R. C. Kedzie, M. D., Pres. State Board of Health	Lansing, Mich.	1879.
James M. Keith, Health Commissioner	Boston, Mass.	1879.
Dr. J. M. Keller	Hot Springs, Ark.	1879.
Dr. J. H. Kellogg, Mem. State Board of Health	Battle Creek, Mich.	1878.
Hon. Wm. D. Kelly	Philadelphia, Pa.	1874.
Hon. T. A. Kercheval, Mayor	Nashville, Tenn.	1879.
Dr. Isaac N. Kerlin	Media, Pa.	1874.
Prof. W. C. Kerr	Raleigh, N. C.	1874.
Dr. R. F. Keyes	Nashville, Tenn.	1879.
Francis T. King, Pres. John Hopkins Hospital	Baltimore, Md.	1875.
Dr. R. A. Kinloch	Charleston, S. C.	1878.
Dr. T. S. Lambert	New York, N. Y.	1874.
Moses Lane, C. E., City Engineer	Milwaukee, Wis.	1877.
Dr. S. Laughton	Bangor, Me.	1876.
Prof. James Law	Ithaca, N. Y.	1872.
Henry C. Lea	Philadelphia, Pa.	1874.
Hon. John M. Lea	Nashville, Tenn.	1879.
Dr. Robt. Lebby, City Registrar	Charleston, S. C.	1878.
Henry Ledyard	New York, N. Y.	1875.
Dr. Benjamin Lee	Philadelphia, Pa.	1874.
Dr. Wm. Lee	Washington, D. C.	1874.
Prof. A. R. Leeds	Hoboken, N. J.	1877.
Dr. J. C. LeHardy	Savannah, Ga.	1879.
Dr. L. Z. Leiter	Chicago, Ill.	1876.
Hon. John Lellyett	Nashville, Tenn.	1879.
Dr. B. B. Lenoir	Lenoir's, Tenn.	1879.
Dr. Frederick D. Lente	New York, N. Y.	1874.
Wm. P. Letchworth	Buffalo, N. Y.	1874.
Dr. H. H. Levy	Richmond, Va.	1878.
Dr. A. D. Lewis	La Grange, Tenn.	1879.
Dr. C. L. Lewis	Nashville, Tenn.	1879.
Dr. Francis W. Lewis	Philadelphia, Pa.	1784.
Prof. A. F. Liautard, N. Y. Veterinary College	New York, N. Y.	1872.
Wm. B. Lillard	Detroit, Mich.	1879.
Prof. C. A. Lindsley, M. D., Health Officer	New Haven, Conn.	1875.
Dr. J. Berrien Lindsley, Health Officer	Nashville, Tenn.	1877.
J. M. Lindsley	Nashville, Tenn.	1879.
Dr. Van S. Lindsley	Nashville, Tenn.	1879.
Dr. Henry Lippincott	Port Whipple, Ariz.	1874.
Dr. C. A. Logan	Chicago, Ill.	1877.

W. P. P. Longfellow, C. E.	Cambridge, Mass.	1876.
Dr. Isaac N. Love	St. Louis, Mo.	1879.
Dr. Wm. S. Ludlam	New York, N. Y.	1874.
Prof. N. T. Lupton, LL. D.	Nashville, Tenn.	1879.
A. Hume Lusk	Nashville, Tenn.	1879.
Albert Lybrock, Architect	Richmond, Va.	1876.
Dr. Robert T. Maccoun, Med. Dir. U. S. N.	Washington, D. C.	1875.
J. Maclay, C. E.	New York, N. Y.	1879.
Dr. James B. McCaw	Richmond, Va.	1878.
M. A. McClelland	Knoxville, Tenn.	1879.
Prof. R. S. McCulloch	Baton Rouge, La.	1878.
Dr. Carlos F. McDonald	Brooklyn, N. Y.	1874.
John J. McGavock	Nashville, Tenn.	1879.
Dr. Hunter McGuire	Richmond, Va.	1874.
J. P. McGuire, Pres. Aux. Sani. Association	Nashville, Tenn.	1879.
Dr. D. I. McKew	Baltimore, Md.	1875.
C. W. McLester	Nashville, Tenn.	1879.
Hon. Albert T. McNeal	Bolivar, Tenn.	1879.
Dr. Thos. A. McParlin, U. S. A.	New York, N. Y.	1873.
H. N. McTyeire, D. D., Pres. Vanderbilt Univ.	Nashville, Tenn.	1879.
Prof. T. L. Maddin, M. D.	Nashville, Tenn.	1879.
Hon. Thos. H. Malone	Nashville, Tenn.	1879.
Dr. M. Mannheimer	Chicago, Ill.	1874.
Dr. Solon Marks, Mem. State Board of Health	Milwaukee, Wis.	1876.
Dr. Wm. Marsden	Quebec, Can.	1872.
Dr. E. J. Marsh	Paterson, N. J.	1872.
Rev. Dr. C. K. Marshall	Vicksburg, Miss.	1878.
Dr. R. B. Maury, Mem. State Board of Health	Memphis, Tenn.	1879.
Dr. T. A. Means, Sec. State Board of Health	Montgomery, Ala.	1878.
Dr. John F. Meigs	Philadelphia, Pa.	1874.
Dr. O. H. Menees	Nashville, Tenn.	1879.
Dr. Thos. Menees	Nashville, Tenn.	1879.
Judge J. A. Meredith	Richmond, Va.	1878.
Dr. W. D. Middleton	Davenport, Iowa.	1879.
Dr. J. J. Milhau	41 Lafayette Place, New York, N. Y.	1873.
Dr. Ben. C. Miller	Chicago, Ill.	1873.
Dr. Truman W. Miller, U. S. M. H. S.	Chicago, Ill.	1877.
Prof. J. B. Minor	University of Virginia.	1878.
Dr. Thos. C. Minor, Health Officer	Cincinnati, Ohio.	1874.
Dr. R. W. Mitchell, Mem. Nat. Board of Health	Memphis, Tenn.	1878.
Dr. S. Weir Mitchell	Philadelphia, Pa.	1874.
Dr. E. R. Montgomery	Louisville, Ky.	1879.
Dr. L. H. Montgomery	Chicago, Ill.	1879.
Hon. S. M. Moore	Chicago, Ill.	1877.
Dr. S. P. Moore	Richmond, Va.	1878.
Dr. John Morris	Baltimore, Md.	1874.
Hon. K. J. Morris	Nashville, Tenn.	1879.
Dr. Moreau Morris	Binghamton, N. Y.	1872.
R. L. Morris	Nashville, Tenn.	1879.
Dr. Ambrose Morrison	Nashville, Tenn.	1879.
Dr. Wm. Morrow	Nashville, Tenn.	1879.
Dr. H. A. Mosely	Wartrace, Tenn.	1879.

Dr. Henry Muhlenberg, U. S. M. H. S.		1875.
Dr. Wm. H. Mullins	Chattanooga, Tenn.	1878.
Prof. Chas. E. Munroe, Naval Academy.	Annapolis, Md.	1876.
Dr. Robt. D. Murray, U. S. M. H. S.	Norfolk, Va.	1872.
Prof. W. H. Mussey, M. D.	Cincinnati, Ohio.	1878.
Gen. Albert J. Myer,[1] M. D., U. S. S. S.	Washington, D. C.	1872.
Dr. John T. Nagle	New York, N. Y.	1874.
Dr. H. M. Nash	Norfolk, Va.	1878.
Dr. Thos. L. Neal	Dayton, Ohio.	1872.
Gen. R. P. Neely	Bolivar, Tenn.	1879.
W. C. Nelson	Nashville, Tenn.	1879.
Dr. Timothy Newell.	Providence, R. I.	1876.
Dr. Chas. Nichols	Washington, D. C.	1874.
Dr. Isaac N. Nichols	Newark, N. J.	1873.
Prof. W. R. Nichols	Boston, Mass.	1875.
Dr. L. H. A. Nickerson	Quincy, Ill.	1879.
Dr. John L. Niglas, Health Officer	Peoria, Ill.	1879.
E. O. Nolting	Richmond, Va.	1878.
Dr. J. B. W. Nowlin, Mem. Board of Health	Nashville, Tenn.	1879.
J. B. O'Bryan, Esq.	Nashville, Tenn.	1879.
Fred. Law Olmstead	New York, N. Y.	1872.
Prof. John Ordronaux	Roslin, N. Y.	1872.
Pres. Edward Orton, State Ag. Col.	Columbus, Ohio.	1874.
Ezra A. Osborn, C. E.	Middletown, N. J.	1877.
Dr. J. W. Osborn	Washington, D. C.	1875.
Michael J. O'Shaughnessy	Nashville, Tenn.	1879.
Dr. A. Otterson, President Board of Health	Brooklyn, N. Y.	1879.
J. B. Pace	Richmond, Va.	1878.
Dr. Henry Palmer	Janesville, Wis.	1877.
Dr. Willard Parker	New York, N. Y.	1873.
Dr. Chas. W. Parsons	Providence, R. I.	1873.
Dr. John C. Parsons	Hartford, Conn.	1874.
Dr. Julius H. Patski	Fort Frederick Steele, Wyoming T.	1874.
Dr. Fonner H. Peckham	Providence, R. I.	1873.
Henry E. Pellew	New York, N. Y.	1876.
Dr. Geo. S. Pelzer	Charleston, S. C.	1878.
H. E. Pendleton	Nashville, Tenn.	1879.
Dr. J. W. Penn	Humboldt, Tenn.	1879.
Dr. John C. Peters	New York, N. Y.	1873.
Maj. Green Peyton	University of Virginia.	1878.
Carl Pfeiffer, F. A., I. A.	New York, N. Y.	1872.
E. S. Philbrick, C. E.	Boston, Mass.	1876.
Hon. S. F. Phillips, Solicitor-general	Washington, D. C.	1879.
Ed. H. Pigue	Nashville, Tenn.	1879.
M. B. Pilcher	Nashville, Tenn.	1879.
Dr. Peter Pineo, Marine Hospital	Hyannis, Mass.	1872.
Dr. J. D. Plunket, President State Board of Health	Nashville, Tenn.	1878.
Dr. F. E. Pope	Little Rock, Ark.	1879.
John H. Pope		1879.
Dr. D. T. Porter, President Taxing District	Memphis, Tenn.	1879.
Dr. Joseph T. Porter, U. S. A.	Fort Jefferson, Fla.	1879.

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[1] Deceased 1880.

Wm. Porter	Nashville, Tenn.	1879.
Dr. Thos. K. Powell	Dancyville, Tenn.	1879.
Col. W. P. Prentice	New York, N. Y.	1875.
Dr. H. W. Purnell	Memphis, Tenn.	1879.
Dr. C. P. Putnam	Boston, Mass.	1875.
Dr. J. J. Quinn	Cincinnati, Ohio.	1873.
D. P. Rankin	Nashville, Tenn.	1879.
Dr. John H. Rauch, Sec. State Board of Health	Springfield, Ill.	1872.
Dr. Isaac Ray	3509 Baring Street, Philadelphia, Pa.	1872.
George Redmond, C. E.	Fitchburg, Mass.	1874.
Geo. E. Redwood	Meridian, Miss.	1879.
Dr. J. T. Reeve, Sec. State Board of Health	Appleton, Wis.	1876.
Dr. J. E. Reeves	Wheeling, W. Va.	1872.
Dr. John Reid	Chicago, Ill.	1875.
Dr. Frank Reilly	Washington, D. C.	1874.
Prof. Joseph G. Richardson, M. D., 1835 Chestnut Street	Philadelphia, Pa.	1874.
Dr. W. L. Richardson	76 Boylston Street, Boston, Mass.	1875.
Dr. Wm. G. Rhoads	Philadelphia, Pa.	1875.
Dr. S. D. Robbins		1878.
Dr. Deering J. Roberts	Nashville, Tenn.	1878.
Dr. J. C. Roberts	Pulaski, Tenn.	1879.
Dr. W. B. Rodman, Mem. State Board of Health	Frankfort, Ky.	1879.
Dr. R. G. Rothrock	Nashville, Tenn.	1879.
Dr. Charles P. Russell	New York, N. Y.	1872.
Dr. S. C. Russell	New Orleans, La.	1872.
Dr. R. Rutherford, Mem. State Board of Health	Houston, Tex.	1879.
Dr. L. C. Rynchean	Huntsville, Ala.	1879.
Prof. J. M. Safford, M. D., Member State Board of Health	Nashville, Tenn.	1879.
L. F. Salomon	New Orleans, La.	1879.
F. B. Sanborn	Concord, Mass.	1876.
Dr. D. D. Saunders	Memphis, Tenn.	1879.
Dr. John W. Sawyer	Providence, R. I.	1873.
Dr. N. J. Sawyier, Sec. State Board of Health	Frankfort, Ky.	1879.
Dr. Ernest Schmidt	Chicago, Ill.	1876.
Dr. J. E. D. Scott	Humboldt, Tenn.	1879.
Dr. Avery Segur	281 Henry Street, Brooklyn, N. Y.	1873.
Dr. Wm. Selden	Norfolk, Va.	1878.
Dr. W. R. Sevier	Jonesborough, Tenn.	1879.
Dr. O. G. Sheldon	Reedsburg, Wis.	1876.
Dr. P. D. Sims	Chattanooga, Tenn.	1878.
Dr. C. M. Sitman	Greensburgh, La.	1878.
E. H. Skipwith	Little Rock, Ark.	1879.
Samuel Smedley, C. E.	Philadelphia, Pa.	1874.
Dr. Charles H. Smith	Richmond, Va.	1878.
Maj. E. B. Smith	Richmond, Va.	1878.
Dr. E. Heber Smith, U. S. M. H. S.	New York, N. Y.	1873.
Prof. F. H. Smith	University of Virginia.	1878.
Dr. Hanbury Smith	New York, N. Y.	1873.
Dr. Joseph R. Smith, U. S. A.	Fortress Monroe, Va.	1874.
Dr. Stephen Smith, Mem. Nat. Board of Health	New York, N. Y.	1872.

Prof. W. A. Smith, M. D.	Columbia, Tenn.	1879.
Wm. C. Smith, Architect	Nashville, Tenn.	1879.
Gen. Wm. J. Smith	Memphis, Tenn.	1878.
Dr. W. Snively	Pittsburg, Pa.	1873.
Dr. Edwin M. Snow	Providence, R. I.	1872.
Dr. R. D. Starkweather	Chicago, Ill.	1879.
Eben S. Stearns, D. D., Chancellor University of Nashville	Nashville, Tenn.	1879.
Dr. Isaac H. Stearns	Milwaukee, Wis.	1877.
Dr. R. W. Steger	Nashville, Tenn.	1879.
Hon. Lewis H. Steiner, M. D.	Frederick City, Md.	1872.
Dr. C. B. Stemen	Van Wert, Ohio.	1877.
Dr. Jas. B. Stephens	Nashville, Tenn.	1879.
Dr. J. Bunyan Stephens	Nashville, Tenn.	1879.
Dr. J. K. Stephens	Ralston, Tenn.	1879.
Dr. Geo. M. Sternberg, U. S. A.		1874.
Dr. W. H. Stetwell	Humboldt, Tenn.	1879.
Dr. Jas. A. Steuart, Health Commissioner	Baltimore, Md.	1874.
Dr. Thaddeus M. Stevens	Indianapolis, Ind.	1875.
Dr. John M. Stevenson	Baltimore, Md.	1875.
Dr. W. G. Stevenson	Poughkeepsie, N. Y.	1878.
Dr. E. V. Stoddard	Rochester, N. Y.	1875.
Leander Stone	Chicago, Ill.	1877.
Dr. H. P. Strong, Mem. State Board of Health	Beloit, Wis.	1876.
Dr. Francis H. Stuart	Brooklyn, N. Y.	1876.
Dr. Thos. O. Summers	Nashville, Tenn.	1879.
Dr. T. H. Swaim	Gleason, Tenn.	1879.
Dr. Samuel Swift	Yonkers, N. Y.	1875.
Dr. A. B. Tadlock	Knoxville, Tenn.	1879.
William D. Talbot	Nashville, Tenn.	1879.
Prof. F. L. Taney, M. D., Mem. State Board of Health	New Orleans, La.	1879.
Albert B. Tavel	Nashville, Tenn.	1879.
Dr. Genet Taylor	Camden, N. J.	1874.
John J. Taylor	Jackson, Tenn.	1879.
Dr. W. W. Taylor	Brownsville, Tenn.	1879.
James Thomas, Jr.	Richmond, Va.	1878.
Dr. J. G. Thomas	Savannah, Ga.	1875.
Dr. R. C. Thomas, Mem. State Board of Health	Bowling Green, Ky.	1879.
Mrs. Elizabeth Thompson	New York, N. Y.	1878.
Rev. Hugh Miller Thompson, D. D.	New Orleans, La.	1879.
Dr. Pinckney Thompson, Pres. State Board of Health	Henderson, Ky.	1879.
Charles H. Thomson	New Haven, Conn.	1877.
Dr. G. B. Thornton, Pres. Board of Health	Memphis, Tenn.	1879.
Dr. Joseph M. Toner	Washington, D. C.	1872.
Prof. Wm. P. Tonry, Ph. D.	Baltimore, Md.	1878.
Dr. Joseph M. Towler	Columbia, Tenn.	1879.
Dr. Smith Townshend, Health Officer	Washington, D. C.	1879.
Dr. Geo. E. Trescott	Greenville, S. C.	1878.
Dr. Samuel N. Troth	1335 Franklin Street, Philadelphia, Pa.	1874.
Dr. J. Rufus Tryon, U. S. N.	32 West 10th Street, New York, N. Y.	1878.
Dr. N. G. Tucker	Nashville, Tenn.	1879.

Dr. Thomas J. Turner, U. S. N., Sec. Nat. Board of Health	Washington, D. C.	1877.
Dr. T. J. Tyner	Memphis, Tenn.	1879.
Dr. W. C. Van Bibber	47 Franklin Street, Baltimore, Md.	1875.
Dr. J. H. Van Deman	Chattanooga, Tenn.	1875.
Dr. S. O. Van der Poel, Ex-Health Officer, Port of New York	Albany, N. Y.	1871.
Dr. B. H. Van Deusen	Kalamazoo, Mich.	1875.
Col. C. S. Venable	University of Virginia.	1878.
Gen. Egbert L. Viele	New York, N. Y.	1875.
Prof. Francis A. Walker	New Haven, Conn.	1873.
Dr. Jerome Walker	Brookyn, N. Y.	1876.
Dr. J. P. Wall	Tampa, Fla.	1875.
Prof. Ellerslie Wallace	Philadelphia, Pa.	1874.
W. F. Walthall	Mobile, Ala.	1878.
Dr. J. R. Ward	Gowanstown, Md.	1878.
Dr. John A. Warder	Cincinnati, Ohio.	1878.
Dr. Horace Wardner, Pres. State Board of Health	Anna, Ill.	1877.
Col. Geo. E. Waring, C. E.	Newport, R. I.	1875.
Jas. C. Warner	Nashville, Tenn.	1879.
Dr. Charles Warren	Washington, D. C.	1874.
J. H. Washington	Murfreesborough, Tenn.	1879.
Dr. A. P. Waterfield	Mackenzie, Tenn.	1879.
Samuel Watkins	Nashville, Tenn.	1879.
Dr. R. D. Webb	Livingston, Ala.	1878.
Dr. Warren Webster, U. S. A.	Boston, Mass.	1873.
Dr. Wm. R. Weisiger	Manchester, Va.	1878.
Ashbel Welch, C. E.	Lambertsville, N. J.	1877.
Dr. J. S. Wellford	Richmond, Va.	1878.
Hon. John Welsh	Philadelphia, Pa.	1874.
Dr. W. F. Westmoreland	Atlanta, Ga.	1879.
Dr. Wm. C. Wey	Elmira, N. Y.	1872.
Hon. Andrew D. White	Ithaca, N. Y.	1872.
Dr. C. B. White	New Orleans, La.	1872.
J. P. White	Nashville, Tenn.	1879.
Dr. Octavius A. White	New York, N. Y.	1876.
Dr. Robert White, Jr., U. S. M. H. S.	Philadelphia, Pa.	1878.
Dr. R. C. White	Morgan City, La.	1879.
Dr. Wm. White	Franklin, Tenn.	1879.
Dr. J. B. Whitehead	Norfolk, Va.	1875.
Dr. Wm. R. Whitehead	Denver, Col.	1874.
Dr. E. M. Wight, Mem. State Board of Health	Chattanooga, Tenn.	1879.
Dr. O. W. Wight, Commissioner of Health	Milwaukee, Wis.	1879.
Gen. J. T. Wilder	Chattanooga, Tenn.	1879.
Prof. T. P. Wilson	Cincinnati, Ohio.	1879.
Rev. Fred. H. Wines	Springfield, Ill.	1876.
Dr. W. B. Winn	Memphis, Tenn.	1879.
Dr. Julius Wise	Memphis, Tenn.	1879.
Dr. G. F. Witter, Mem. State Board of Health	Grand Rapids, Wis.	1877.
Prof. Edward S. Wood, M. D.	Boston, Mass.	1875.
Dr. Thomas F. Wood	Newbern, N. C.	1878.
William Woodfolk	Nashville, Tenn.	1879.

Dr. Alfred A. Woodhull	Atlanta, Ga.	1874.
Dr. Joseph J. Woodward, U. S. A.	Washington, D. C.	1872.
Wm. E. Worthen, C. E.	New York, N. Y.	1873.
Dr. Horatio P. Wright	North Evanston, Ill.	1879.
Dr. John Wright	Panola, Miss.	1879.
Hon. Pitkin C. Wright	Nashville, Tenn.	1879.
Dr. R. M. Wyckoff	Brooklyn, N. Y.	1875.
Dr. Lunsford P. Yandell	Louisville, Ky.	1879.
Prof. Geo. H. Yeaman	New York, N. Y.	1876.
Dr. Euston Yonge	Savannah, Ga.	1878.

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